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Hart, Schaffner & Marx Prize Essays

XIX

THE CANADIAN IRON AND STEEL INDUSTRY

A STUDY IN THE ECONOMIC HISTORY OF A PROTECTED INDUSTRY

THE CANADIAN IRON AND STEEL INDUSTRY

A STUDY IN THE ECONOMIC HISTORY
OF A PROTECTED INDUSTRY

BY
W. J. A. DONALD, PH.D.
McMaster University

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PREFACE

This series of books owes its existence to the generosity of Messrs. Hart, Schaffner & Marx, of Chicago, who have shown a special interest in trying to draw the attention of American youth to the study of economic and commercial subjects. For this purpose they have delegated to the undersigned committee the task of selecting or approving of topics, making announcements, and awarding prizes annually for those who wish to compete.

For the year ending June 1, 1913, there were offered: —

In Class A, which included any American without restriction, a first prize of $1000, and a second prize of $500.

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Any essay submitted in Class B, if deemed of sufficient merit, could receive a prize in Class A.

The present volume, submitted in Class A, was awarded honorable mention in that class.

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AUTHOR'S PREFACE

This book is an attempt to study the economic history and problems of a particular Canadian industry. It was undertaken in a twofold belief. In the first place, the general economic history of Canada can never be thoroughly understood or properly written until a number of studies, similar to the one at hand, provide the detailed basis for general conclusions. Wanting the detailed studies of particular phases, those who have written on general economic history, heretofore, have emphasized the obvious features, namely, the political incidents and problems. It is to be hoped that we may soon have other studies of this kind contributing to the knowledge of the general economic history of Canada.

In the second place, the writer was interested in what has been, and may soon become again, a serious controversial problem in Canada, namely, the relation of protection to the growth of the Canadian iron and steel industry. At the same time, he realized the difficulty of treating such a controversial political problem impartially. To avoid discussing the topic in a partisan manner and to present a treatment that would command impartial reading was essential. One method suggested itself, and that method fitted into what became the main purpose of the book. The writer hopes that by making the economic history of a protected industry the main theme of the book, and by treating the controversial topic as of secondary importance, two purposes have been fulfilled. The economic history of the industry should contribute, not only to an understanding of the general economic history of Canada, but also to the solution of the controverted question; and by treating the controversy respecting protection to the iron

and steel industry in Canada as of secondary importance, it has been given more impartial consideration, perhaps, than it might otherwise have received.

Whether the history of this industry has been scientifically treated, the reader is left to judge. The success of the method of discussing the protective policy is partly demonstrated by the fact that on two important points the writer was forced to change his views. Starting out with an opinion commonly accepted in Canada that the success of the primary iron and steel industry was largely due to the bounty system, the writer reached the conclusion that the greater part of the primary industry would have grown up whether or not protection in the form of bounties had been given. On the other hand, the writer now believes that tariff protection did have a stimulating effect on certain branches of the finishing industry. Thus the method adopted has at least succeeded in modifying the views of the author. If the discussion of the controversial problem receives the impartial attention of the reader, the wisdom of this method of treating politico-economic problems may seem amply proved.

The writer feels deeply indebted to Professor Chester Whitney Wright of the University of Chicago for much encouragement and guidance in the preparation of this book, and to Mr. Vincent Basevi of the Toronto Bureau of Municipal Research for assistance in the revision of the manuscript.

W. J. A. Donald.

McMaster University,
September, 1914.

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THE CANADIAN IRON AND STEEL INDUSTRY

PART ONE

INTRODUCTION: THE ECONOMIC BACKGROUND

THE CANADIAN IRON AND STEEL INDUSTRY

CHAPTER I

THE INDUSTRIAL DEVELOPMENT OF CANADA

§ 1. Canadian industrial history cannot be properly written until detailed studies of all the important phases of development are available. While a few such problems as banking and tariff history have been more or less carefully treated, the number of such studies is altogether too small for a proper understanding of Canadian industrial development as a whole. The purpose of this book is, in part, to add to the available material by tracing the development of a particular industry.

Among the various industries which might thus be taken up, the manufacture of iron and steel has seemed to be the most important. Those countries which have undergone the greatest economic development produce the most iron and steel. Great Britain, the United States, and Germany lead in this important industry as in industrial development in general. Canada, on the other hand, which has not progressed until recently, is far behind her neighbor, the United States, in the development of her iron and steel industry. Hence it is that a study of the economic history of the Canadian iron and steel industry ought to contribute very largely to the understanding of the general economic history of Canada.

In order to understand the history of a particular industry, it is necessary to know something of the general economic background in the various periods of its history. This is especially true in the case of the iron and steel

industry, which is frequently spoken of as a barometer of general trade conditions; an expression obviously implying that its developments and periods of prosperity or depression are largely determined by the general industrial condition of the country. It is evident, therefore, that some knowledge of the background of Canadian industrial history and the forces hastening or retarding the country's economic development will be essential to an understanding of our subject.

Furthermore, the iron and steel industry cannot prosper without the advantages of favorable natural conditions for the supply of raw materials. Coal, ore, and fluxing materials must be obtainable so that they may be cheaply assembled at or near the market for iron and steel. It thus becomes necessary to add to our background of industrial history a survey of the natural resources in Canada and the conditions under which they have been available.

To determine what part protection has had in the development of the Canadian iron and steel industry is a second purpose of our study, but in this, also, the background is essential, for the application of the national policy of protection to the iron and steel industry reflects general economic conditions. For these reasons, then, Part One of our study treats of the various factors in the industrial development of Canada in different periods, together with the natural resources of the Canadian iron and steel industry.

§ 2. Canada has not yet undergone a great expansion of industry commensurate with that found in the United States. Indeed, a prominent feature of Canadian history is the relative lateness of the country's economic development as compared with that of her southern neighbor. While the population of the United States was rapidly increasing, that of Canada long remained almost stationary. The expansion of railway systems in western Canada is coming from three to five decades later than it did in

southern latitudes. In many other respects, the United States has progressed much more rapidly than Canada. This is true of manufactures and of the manufacture of iron and steel in particular.

In Canada, however, since Confederation, and especially since 1897 or 1900, wonderful progress has been achieved. Compared with economic organization in the French régime, which lasted until 1760, and in the provincial period which lasted until Confederation in 1867, the economic life of the last twenty or thirty years of the nineteenth century and during the twentieth century was marked by extraordinary progress. The conditions and factors of the economic life of these four main periods of Canadian history will now receive our attention.

§ 3. In the period of French control, which lasted until 1760, is found a typical mercantile colonial policy degenerated into colonial misgovernment. Colonization was almost a failure. Trading companies purchased the exclusive privileges of the fur trade with promises of settlement and colonization, which were if possible entirely disregarded and were in any case rarely properly carried out. Fishing and the fur trade, which received chief attention, did not require permanent economic organization. Agriculture lagged under a seigneurial system transported from France. Industry was practically undeveloped, and colonial trading and commerce were entirely subservient to French trading interests. The mother country, with little thought of the future, regarded New France, its natives and resources, as a legitimate field for immediate economic exploitation. To make matters worse, the administrators were often inefficient, and preyed on the colonists or any industrial undertaking, such as the Government iron forges, to fill their own private coffers.

The results of French colonization methods became painfully obvious after the Peace of Paris, in 1763, when

Canada passed finally into the hands of the British. Many of the French *noblesse* moved back to the homeland, leaving in Canada only the *habitants*, with their primitive social customs, lack of initiative, poor educational system, and restricted local interests; conditions which even to-day are being modified only slowly.

To the disadvantages of the French colonial policy must be added the climatic conditions of Canada, which have probably retarded the development of the country more than any other single factor. As the isothermal lines roughly follow the southern shores of the Great Lakes, what is now Ontario is almost as cold as the most northerly limits of the United States. Furthermore, the rivers and lakes, which were an important means of transportation in early years, were useless for five or six months of the year. The ice on the St. Lawrence River, which was the sole outlet for the produce of Canada during the French régime, closed navigation for a great part of the year. It is easy, then, to understand how the settlement of territory now comprising Ontario was so handicapped as to be practically impossible during the French régime.

It is not surprising, therefore, that, when in 1763 England secured control of the French colonies in America, the population of Canada was less than 70,000 as compared with a population of over 3,000,000 in the English-speaking colonies to the south.[1] Industry and agriculture were carried on under most unfavorable circumstances, and trade was conducted under a system of exploitation by trading companies authorized by the mother country.

§ 4. Unfortunately, the transition to British control failed, in many respects, to bring with it immediate redress. It merely ushered in the provincial period dating from 1760 to 1867. The history of this period differs from the French

[1] W. J. A. Donald, "The Growth and Distribution of the Canadian Population," *Journal of Political Economy*, vol. xxi, p. 297.

régime largely in that trade, commerce, and commercial policy were linked with British rather than French institutions at a time when British industrial supremacy was rapidly gaining ground. It was provincial in that each Province controlled its own affairs subject to the approval of the British Parliament. Upper and Lower Canada[1] were given separate political institutions. Acadia,[2] secured by England in 1713, had its own separate political and economic life. Whereas the Federal Government of the United States was able to develop some uniformity of economic policy according to methods prescribed by the Constitution, it was not until the passing of the Act of Union, in 1841, that any unity of action and interest was made possible in Canada, and what was secured at that time applied only to the two Provinces of Upper and Lower Canada. Even then, provincial interests were often predominant. The larger national point of view was forgotten in the heat of party strife or checked by the conservatism of the French-Canadian element.

Connected with the provincial and local spirit of these early days was the Canadian race question, which is still an important factor in Canadian life and politics. The great body of the population of Quebec is composed of people different from the rest of the Canadians in blood and temperament, in language and customs, in religion and education, and in ideals and traditions. This was one reason for giving Upper and Lower Canada different political institutions; but, even after the Act of Union, the race question so permeated the political world as to unfit legislators' minds for calm and unprejudiced consideration of the more fundamental questions of the economic development of the country. The French-Canadian element more than once prevented the passing of legislation which would have aided the advancement of the English Province. For instance, as late as 1865, the deepening and improvement of

[1] Now Ontario and Quebec. [2] Now the Maritime Provinces.

the Lachine Canals on the Upper St. Lawrence was opposed because it was calculated to benefit Upper rather than Lower Canada.[1]

The geographical features of the country, too, had much to do with the political and economic development of Canada. The Maritime Provinces were, and still are, shut off from the Central Provinces by the projection of New England into what would naturally seem Canadian territory. As this disadvantage still exists, the Maritime Provinces have retained a certain feeling of isolation, and the Central and Western Provinces have an unfortunate lack of interest in the Eastern Provinces. Upper Canada, now Ontario, extending as it did south and west into the northern part of the United States, was partially shut off from the foreign trade by a combination of misfortunes. The exportation of her produce to the growing market in the North Central States was limited by the various tariffs imposed from time to time by the United States Government. Forced thus to turn eastward for an outlet for her produce, the disadvantage of distance from European markets was augmented by the fact that her products were for several months of every year closed in by the ice of the St. Lawrence and the Great Lakes. Lower Canada, on the other hand, was in a position to control the export and import trade, and it exercised this power to the extent of making a bargain by which, according to the Act of Union, it paid to Upper Canada only a small portion of the customs duties, and thus virtually placed a toll on the production and consumption of Upper Canada.

Likewise, the westward movement, which played such an important rôle in the development of the United States from the War of 1812 to recent years, was long retarded in Canada by geographical conditions. In the earlier years, the natural route of western migration was along the water-

[1] G. V. Cousins, "Early Transportation in Canada," *University Magazine*, December, 1907, p. 507.

ways. In Canada it followed the northern shores of Lakes Ontario and Erie. When the western movement in the United States was reaching the Mississippi Valley, Canadian migration, instead of following the northern shores of Lakes Huron and Superior, moved through Michigan into the United States and thus helped in the building-up of the great American West.

Doubtless this movement of population was affected by the climatic condition of the country. The rigor of the Canadian winter was sufficient to drive the majority of European emigrants to the United States where opportunities were quite as great as in Canada and the results obtainable with less sacrifice. Indeed, for a long period there was a constant drain on the population of Canada through the emigration of many people to what seemed a country of greater and more immediate opportunity.

The potential agricultural, mineral, and forest wealth of a country cannot be exploited until adequate transportation is available, and Canada was not oversupplied with this important asset. Here again, geographical features and climatic conditions were important. Canada has, of course, an abundance of waterways, which are a great natural advantage when properly improved and used. Since Halifax and St. John, which have excellent harbors, were too far distant from Ontario to provide an outlet for bulky produce, especially during the pre-railway era, the St. Lawrence River became the main outlet for Ontario's products. Nature, however, placed many obstacles in the way of navigation on the St. Lawrence, and these had to be overcome by the expenditure of many millions of dollars. To put Montreal at the head of navigation was no small task. As the St. Lawrence was extremely shallow at many points between Quebec and Montreal, vessels drawing more than ten or twelve feet of water were unable to reach Montreal during a large part of the navigation season. As early as 1826 the deepening of the channel

was proposed, but dredging operations were not started until eighteen years later. Besides these river improvements, it was necessary to build canals to provide a route by which the falls at Niagara and the rapids of the Upper St. Lawrence River might be avoided. Even with these improvements the results were only partially satisfactory, for during the winter months the St. Lawrence was ice-bound and traffic was forced into other channels. In the mean time, however, the Erie Canal and the railways of the Eastern States had attracted to New York the great bulk of the traffic from Canada to Europe.

Since water transportation was restricted to the open months, railway and other land transportation facilities were most important for internal development. A study of rates in force before the railway era reveals the inefficiency of the facilities provided. Before 1812, when it cost $7 to ship a ton of freight from Liverpool to Montreal, the rates from Montreal to the upper end of Lake Ontario varied from $20 to $27 a ton. High rates, of course, prevented the movement of traffic, and thus retarded the economic development of the country.[1]

The condition of roads in Canada was deplorable; and, in 1770, Carleton, the Governor, was compelled to enforce the individual responsibility of proprietors and tenants to keep the post roads in repair. Owing to the resistance of the French-Canadians to enforced labor, it was not until Sydenham's time, from 1839 to 1841, that much improvement was effected. Since the Canadian winter with its frost and snow gave a firm, smooth road for heavy loads, winter roads were very important. For many years they were used almost exclusively for all traffic that could not be shipped by water during the season of navigation. Corduroy roads and turnpikes were common, but the corduroy roads, at their best a wretched means of transportation, were usually in a poor state of repair. In Upper Canada,

[1] Cousins, *op. cit.*, p. 611.

especially, the turnpikes were controlled by joint-stock companies which not only charged excessive tolls, but failed to keep the roads in good condition. Later, the Government took charge of this public service, maintaining its control until 1841, when it seemed advisable to place the roads under the control of the municipalities.[1]

The value of the railway was not quickly realized in Canada, for it was expected that waterways would be sufficient for internal transportation. Consequently, enormous sums of money were expended on canals, even after 1840, when the superiority of the railroad had already been proved in England and in the United States. Canada's delay in adopting the railway was, of course, partly due to the fact that traffic was limited in amount, and partly due to the fact that waterways did supply a great deal of the demand. Yet, even after the value of the railway was recognized and railway construction had begun, geographical features deterred rapid expansion of the railway net. The forbidding nature of the country to the north of Lakes Huron and Superior for many years proved a barrier to transportation to the west. The rocks and forests of the Ontario highlands and of the Rocky Mountains were obstacles greater than railway building was at that time willing to surmount. Furthermore, this section of the country did not offer any prospects of a profitable traffic in the immediate future. While the Grand Trunk, with both terminals in the United States, reached Chicago in the early seventies, the building of a national transcontinental railway in Canada was only a mooted question, until in the eighties British Columbia's unqualified demands for a railway to unite her to the Eastern and Western Provinces forced the building, at whatever cost, of the Canadian Pacific Railroad.

Other conditions, too, were backward. Agricultural methods were, of course, primitive, especially in Quebec,

[1] Cousins, *op. cit.*, pp. 613–15.

where the French clung to old methods. It is scarcely necessary to add that the climate limited the agricultural area, and prevented the culture of certain kinds of produce. The climate of the Northland together with geographical features prevented the development of agriculture in Western Canada. Had Western Canada been able to ship produce to England via Hudson's Bay, Canadian economic development might have been very different, and Hudson's Bay might have been for Canada what the Gulf of Mexico and the Mississippi River were to the United States before 1860. The repeal of the Corn Laws by Great Britain in 1846 to 1849, and the consequent loss of the preference that Great Britain had given colonial products, led to special difficulties and resulted in serious economic depression, followed by talk of annexation to the United States. The passage of the Elgin-Marcy Reciprocity Treaty in 1854, under which Canadian natural products for a time found a free market in the United States, relieved this situation both politically and economically until practically the end of the provincial period.

Manufacturing industry did not make great advances throughout this provincial period. The tariff was never high enough to give an extraordinary stimulus to manufacturing, and other lines of endeavor clearly offered more attractive and sure returns. It cannot be denied, of course, that Canada made some progress. Between 1763 and 1791 about 30,000 United Empire Loyalists had settled in the country. In 1790, Quebec had a population of over 160,000. By 1851, Quebec had a population of 890,000 and Ontario of 952,000; by 1871, the population of the two Provinces had increased to 1,912,000 and 1,621,000 respectively.[1] Great Britain colonized her new territory with a great influx of English, Irish, and Scotch, and Quebec grew in numbers by reason of immigration and the remarkable increase of the native population. As we have already seen,

[1] Donald, *op. cit.*, pp. 297–98.

the system of roads was gradually extended; several canals were built, waterways were generally improved from time to time, and railroads were introduced so that there were 4800 miles in operation in 1875.[1] By 1868, Canada's aggregate trade amounted to $131,000,000.[2] Nevertheless, economic development was slow and irregular and, one may well add, provincial, in view of the influence of geographical and climatic conditions, the lack of adequate transportation facilities, and the movement of population through and from Canada to the United States.

§ 5. Finally, by the British North America Act of 1867, a union of practically all British territory in North America was consummated, and to some extent provincial interests in economic questions were subordinated to a larger national point of view. Political union did not, however, improve the economic situation at once. In fact, a period of depression followed the repeal of the Reciprocity Act in 1866, and after a few brief years of prosperity, from 1869 to 1872, the financial depression of the seventies set in. This, with other depressions in the early eighties and in the nineties, made the whole period from 1867 to 1897 an era of trial.

Throughout the period of Confederation the development of Canada was greatly hampered by the tariff wall set up between Canada and the United States. After the Civil War the rates of duty on most goods entering the United States were higher than ever before, and in 1879 Canada herself adopted the "National Policy of Protection." As a result of these artificial restrictions, both countries lost the advantages of international trade, but the Canadian producers of raw materials suffered more than the American producers through inability to secure as large a market as they needed. In other instances, the Canadian tariff so raised the prices of manufactured articles that en-

[1] *Canada Year-Book*, 1913, p. 443. [2] *Ibid.*, p. 227.

ter into the manufacture of other products as to impede the exploitation of Canada's natural resources. While the Canadian tariff undoubtedly encouraged the introduction of many Canadian manufacturing industries, yet it certainly was a great burden on Canada's extractive industries. The high cost of machinery was a particularly important case of this effect of the high tariff. Since very little machinery has been made in Canada until recently, a protective tariff in most instances enormously increased the cost of securing up-to-date machines. It is notorious that, in many cases, the machinery in use in Canada was several years behind current inventions. The tariff on agricultural implements has always been a special grievance to the farmers. In fact, this is so true that the manufacturers of implements maintain that, whenever adverse criticism of the tariff arises, they have to bear the chief burden of tariff reductions. For a long time this burden applied also to mining operations, until, in 1907, certain machinery entering Canada for use in mining was placed on the free list. There seems to be some basis, then, for the statement that the tariff on machinery was a far greater burden on the purchasers than the benefit to the producers of this protected list of commodities warranted.[1]

Canada suffered, too, from the lack of certain agents of production. Most important was the lack of capital. For some reason or other, Canadians themselves preferred the chimney-piece as the repository of their hard-earned gains. British investors long remained cautious about investing in Canada. British disappointment in the value of the securities of the Grand Trunk Railway was for a protracted period a great blow to Canada's borrowing power. Meanwhile, Great Britain had ample opportunity to invest elsewhere, especially in the United States. For many years American capital, which to-day is undertaking a very large

[1] "The Industrial Development of Canada," *American Machinist*, vol. XXIV, p. 905.

part of the task of developing Canadian manufacturing industry, found sufficient opportunities at home, and Canada was ignored. Of course, this lack of capital may be partly explained by the fact that for a long time Canada herself offered little or no encouragement to industry. The Canadian home market was not large enough to support any large establishment, and the manufacturers' tariff-aided rivals in the United States were able to supply the Canadian market at rates which prevented the investment in Canada of American, British, and domestic capital. Again, the lack of coal in close proximity to manufacturing centers was a retarding factor. While water power is found in abundance, and is now minimizing the importance of this deficiency, in the nineteenth century this was of relatively little value in the nation's industrial progress. Consequently, during this period, when close proximity of coal to iron ores was an essential condition for the development of the iron and steel industry, Canada was at a distinct disadvantage.

Geographical features still restrained the westward movement and the building of transcontinental railways. As Lakes Winnipeg and Manitoba stretched themselves one hundred miles north and south only a short distance from the American border, all transcontinental railways were forced to round the southern end of these lakes, and as a result only the southern border of Canada was developed. Only in the last few years has the fact been recognized that the Northland is to play an important rôle in western development.

Nevertheless a certain amount of progress was made. The building of the Intercolonial Railway in the seventies and of the Canadian Pacific in the eighties brought a greater unity of economic relations by joining the Maritime, Central, and Western Provinces and districts and thus somewhat counteracted the retarding influence of the geographical characteristics of Canada. Railway mileage

increased from 2278 miles in 1867 to 6858 miles in 1879 and 16,550 miles in 1897.[1] The granting of subsidies to the Canadian Pacific and the building of the Intercolonial Railway by the Government involved heavy expenditures, and even the Liberal Party, despite its opposition to high protection, was forced in 1874 to impose higher duties on imports. Then, in 1879, the national policy of protection was put into operation by the Conservative Party, which extended its application from time to time to an increasing number of growing industries. Under the influence of protection and the building of Canadian railways considerable progress was made in manufacturing, but only to supply the Canadian market. The population grew from about 3,000,000 to 5,000,000, and Canada's aggregate external trade grew from $131,000,000 in 1868 to $300,000,000 in 1897.[2] Occasional periods of real prosperity brightened the general era of difficulty. Nevertheless, it has to be admitted that the success of Confederation was political rather than economic, and that, until just before the beginning of the twentieth century, Canada did not seem to have the prospect of any great economic future.

§ 6. In the recent era of prosperity which the future will date roughly from 1900, a remarkable expansion of industry and agriculture and an extraordinary increase of population have come to Canada. The Government, by means of a vigorous encouragement of immigration, has brought many settlers to the Dominion, and a lenient and progressive land policy has made the Canadian West the land of opportunity for those who will, for a few years, brave the difficulties and trials of a pioneer life. An increase of railway mileage from 16,550 miles in 1897 to 29,304 miles in 1913 has opened up [3] new areas for agricultural production and an agricultural population, and has resulted in employment for many people in construction work of various

[1] *Canada Year-Book*, 1913, p. 443. [2] *Ibid.*, p. 228. [3] *Ibid.*, p. 443.

kinds on the frontier and in the manufacturing cities. Not only has the emigration to the United States been checked, but the tide has actually turned in the other direction. Canada's population increased to 7,200,000 in 1910 [1] and probably has mounted to over 8,000,000 in 1914. The climate has not prevented the desirable immigration in the last few decades. While it tends to exclude the less desirable southern Europeans, it presents no terrors to the hardy races of northern Europe. Moreover, it has given the Canadian people the vigor and energy necessary for the task of developing the opportunities at hand. Scientific investigation has shown that climatic conditions are not an impassable barrier to many important branches of agriculture and, in fact, are an advantage in the production of hardy varieties of certain grains. While the climate will always present certain difficulties, these will henceforth retard Canadian development less than in the past.

As we have already seen, Confederation largely destroyed the provincial spirit of the pre-Confederation era, and while there is still and probably always will be evidence of partial local interest, nevertheless, the vision of the broader national interests is more widespread. This is, of course, a natural result, not only of Confederation, but also of the growth of agencies of communication and transportation. Economically, Canada, with her system of railways running east and west across the continent, is more of a unit than ever before, and the disadvantages of geographical features are being overcome as rapidly as is good for so young a nation. This growth has necessitated the investment of much Canadian, and of British, American, French, and other foreign capital, which now finds in Canada an unexampled field to exploit. In fact, the most important question is whether Canada has not been borrowing too rapidly. The lack of coal in Ontario, while still a disadvantage, is being gradually overcome by the use of unrivaled

[1] Donald, *op. cit.*, p. 306.

water power and the electricity derived therefrom. The tariff on many lines of machinery has been withdrawn or reduced, to the advantage of extractive and other industries, and, while Canada rejected the Reciprocity proposals of 1911, the partial withdrawal of the United States from the world markets in raw products, especially hard grains, timber, and minerals, together with the reduction of the American tariff on many articles and the increased home market, has opened a new opportunity for Canadian extractive industries. The building of railways and other construction work of the last two decades and the increase of the population have provided Canadian manufacturers with a larger market, somewhat curtailed, it is true, by the importation of the products of American tariff-fed manufacturing industries. Ample proof of Canada's recent prosperity lies in the fact that, besides her domestic trade, Canada's exports increased from $137,000,000 in 1897 to $479,000,000 in 1914; her imports increased from $119,000,000 in 1897 to $650,000,000 in 1914; and her aggregate external trade, from $257,000,000 in 1897 to $1,130,000,000 in 1914.[1] In short, in the last two decades, Canada has been ushered into an era of remarkable material prosperity.

§ 7. As we have already suggested, the history of the Canadian iron and steel industry is necessarily woven into the web of general industrial conditions. For many years it struggled on in spite of the backward condition of the country. Many were the failures that overtook early enterprises. The last decade, however, has seen an enormous development of this special industry as of Canadian industry in general. The development of transportation facilities has opened up new markets by building up a rapidly increasing demand in the West. Railway construction has itself caused a direct demand for steel rails, bridge materials, car wheels, and other iron and steel products. Building

[1] *Canada Year-Book*, 1913, p. 228.

operations have been calling for a larger output of structural steel. The expansion of agriculture has created a new demand for steel entering into the manufacture of agricultural implements, wire fencing, and tools. Immigration is supplying the labor force previously inadequate for any large industrial enterprise. Last, but not least, the growth of the country has resulted in the discovery of unknown deposits of raw materials, chief among them coal and iron ore, on which the industry we are considering depends.

CHAPTER II

NATURAL RESOURCES OF THE CANADIAN IRON AND STEEL INDUSTRY [1]

§ 1. While, as we have seen, the industrial development of a country exercises a very important influence on its iron and steel industry, yet this influence is qualified and limited by the nature of the available resources and the conditions affecting the assembling and use of ore, coal, flux, and other materials. Before considering the resources and natural conditions of the Canadian iron and steel industry, it is desirable to discuss the factors influencing the development and use of these essentials.

An estimate of the iron supplies of a country must include consideration of the question of general availability, and this, of course, involves the problem of the relationship of costs and prices. If ores are of low grade, if they are difficult to mine, if they are far distant from the market, or from fuel and fluxing materials, or if they are subject to poor or costly transportation, their immediate utilization may be impracticable, and future developments must be awaited. On the other hand, if the demand for the product is strong, if the production of ore is protected by an adequate customs duty, or if the market of a neighboring foreign nation is a large and open one, otherwise unmarketable ores may be profitably mined.

Of fundamental importance in the availability of iron ores is the matter of costs. Of these, the most important are the costs of mining the ore, of transportation to the furnace, and such costs of reduction as arise from the nature of the ore itself.

[1] See the maps in the Appendix showing the location of the resources here described.

§ 2. A point of first consideration in the cost of ore is the nature of mining conditions. Indeed, the cost of raising the ore to the surface may prohibit its utilization. There are limiting depths beyond which mining, on account of the amount of water present, may become altogether too expensive. Whereas many deposits can be worked cheaply in open pits or for a certain distance under the surface, the cost of stripping and timbering may prevent working at greater depths. Another kind of limiting condition arises from the fact that in many cases hematites are mixed with foreign materials, or "gangue," from which the ore must be separated by washing. Similar conditions affect the availability of many deposits of magnetite, except that here the impurities, often other minerals, are so closely associated with the iron ore that they must be separated by magnetic concentration. Where this condition exists, the use of such ores depends, of course, on the cost of the process of concentration and its relation to competition with alternative sources of supply.[1]

§ 3. Of great importance is the accessibility of ores; the character of transportation facilities and proximity to fuel. Naturally, many deposits have long remained undiscovered because of lack of means of transport which would have stimulated and aided prospecting. Others are known to exist in regions so remote from rail, river, or canal facilities and from fuel supplies that they may be considered unavailable so long as they are compelled to compete with more accessible ores. Yet they may be taken into account in considering total reserves, for the influence of accessibility is only relative, and no deposit which is sufficiently large and valuable to warrant at some future date the expenditure necessary for constructing the means of transportation can be regarded as permanently unavailable.[2]

[1] United States Geological Survey, 1908, *Report on Mineral Resources of the United States*, p. 117.

[2] *Ibid.*, p. 117.

Allied to this feature is the problem of the supply of coal and the distance of ores from fuel. This condition may be a more serious disadvantage or more valuable asset than the absence or presence of transport service, which at best is limited in power economically to assemble the raw materials. England won and long held supremacy in steel-making, in spite of the relative inferiority of her iron ore resources, because of the close proximity of the ores to unsurpassed supplies of fuel. But the younger industry of the United States, notwithstanding the handicap of a later start, and widely divided natural resources, has surmounted this difficulty. Cheap water and rail transportation has almost neutralized the wide distances between the ore and fuel.[1] Water transportation is able to play a great part in making possible the assembling of raw materials that would otherwise be commercially separated. England, for instance, is able to receive by water the high-grade ores of Bilboa, Spain. Nowhere in the United States are large quantities of the best steel-making ores[2] found in close proximity to coal. Yet the Great Lakes supply a means of transportation which has made possible the rapid growth of the iron and steel industry in the United States in the last twenty years. Indeed, this factor has had much to do with the reduction of the price of Bessemer steel in the last fifteen years.[3]

This phase of the problem will be seriously affected by the fact that the most noticeable tendency in the iron industry is to use ores of lower average content. This tendency will undoubtedly continue as the more accessible portions of the richer deposits are worked out and as technical improvements are introduced. The decentralization of the iron industry may naturally be expected to

[1] E. Phillips, "Competition in Iron and Steel-making," *Engineering Magazine*, vol. xxi, p. 175.

[2] Ore and coal are found together in Alabama, but the ore is not of Bessemer grade.

[3] J. C. Mills, *Our Inland Seas*, p. 358.

follow the use of inferior ores. This decrease in the iron content of the ore used involves a corresponding increase in the cost of transporting the ore per unit of pig iron produced. This can be partially avoided by producing the pig iron at points nearer the source of the ores. This, in turn, will involve an increase in the proportion of fuel used in the regions producing the ore and an increase in the cost of transporting fuel per ton of pig iron produced.[1] But it appears already that the increased cost of transporting ores, combined with expansion of markets in the Northwest of the United States and in western Canada, has encouraged the building of blast furnaces at Duluth, Sault Ste. Marie, and at Port Arthur, in spite of the higher costs of transporting coal per unit of pig iron produced. Without doubt Canada will reap the benefit of such a tendency by increased use of her ores at or near deposits.

§ 4. In addition to the cost of mining and the accessibility of ores, a third factor affecting the availability of ores is the character of the ore itself, and the consequent effect on the cost of production of iron. The content of metallic iron in ores at present varies from 35 to 75 per cent. This wide variation in the quality of the ores used is due in part to the presence of other materials, such as lime, which might make the ore almost self-fluxing and permit the use of otherwise useless ores. Some ores require roasting to eliminate sulphur. The percentage of copper, chromium, manganese, and especially phosphorus, affects seriously the method and cost of production and the quality of the product.

§ 5. Another factor touching the economic availability of iron ores is the nature of the ownership of raw materials, an important element in the power of the United States Steel Corporation. When a large company controls a

[1] United States Geological Survey, *op. cit.*, p. 118.

variety of ores and is equipped to assemble them, and to form any desired mixture of grades, it may use with advantage ores which could not be used by a small company compelled to dispose of a single grade of product and kind of ore in the open market.[1] Furthermore, a company controlling a great part of the natural resources of high grade might thereby secure virtual monopoly of a country's iron and steel industry. Admittedly, the greatest factor in the strength of the United States Steel Corporation is its practical control of most of the Bessemer ores of commercial value in the United States.

Owing to the varying importance of these different factors, the future advantage in the availability of resources will obviously pass from old to new districts, or at least spread to include new areas of supply. Notwithstanding the increase in the cost of transportation and smelting of ores, per unit of iron produced, lower grades of ores will be called upon as the higher grade and Bessemer ores of the Lake Superior region become depleted. Likewise technical improvements may completely change the whole situation. Electro-metallurgy, which is as yet only in the stage of the scientifically possible, may become economically advantageous. The extended use of the basic open-hearth system is providing an increasing market for many hitherto valueless ores. Most important Canadian ore deposits are best treated by this process. The increased use of magnetic concentration may be of great importance in the economical use of ores, much to the advantage of Canadian sources of supply. Proximity to the fuel supply may become of less importance as it becomes profitable to transport coal or coke to the ores.

There is, then, no reason for believing that the future of a country's iron and steel industry rests on the present state of affairs. A nation or locality may shortly gain a decided advantage in this regard, and yet, since the factors which

[1] United States Geological Survey, *op. cit.*, p. 118.

have been mentioned as influencing the availability of iron ore for commercial use will probably retain a considerable importance, it is well worth while, before entering further on the study of the Canadian iron and steel industry, to consider the character of the present known resources.

§ 6. It is a striking commentary on the extent and character of the iron ores of Canada that the greater part of the ores consumed in the Dominion is not local product, but imported from Newfoundland and the United States. Yet Canada possesses all necessary raw materials for a large iron and steel industry. The most important of those now available belong to the Maritime Provinces, to Quebec, and to Ontario. For our purpose, those of Newfoundland may be included; and those of British Columbia and elsewhere will be treated because of their potential value.

§ 7. The southern part of Nova Scotia is entirely lacking in iron ores,[1] but there are numerous deposits in other parts of the Province. Many of the deposits, however, are so small as to be of no economic importance, and may be neglected here.

Several deposits are known to exist in Annapolis County, on the south shore of the Bay of Fundy. Deposits of magnetite at Clementsport would probably yield a large amount of ore of fair grade.[2] Deposits of hematite, a few miles east, at Nictaux Falls,[3] in Annapolis County, are the most promising in Nova Scotia. There are indications that the district around the Nictaux Falls may be regarded as of considerable importance. Transportation by rail is available from both the Clementsport and Torbrook fields in one direction, and by water, after a short haul, in another direction. Water transportation brings them into close contact with the Cumberland coal-fields of the Province.[4] Omitting a

[1] J. E. Woodman, *The Iron Ores of Nova Scotia*, p. 1.
[2] *Ibid.*, pp. 38–48.
[3] Near Torbrook.
[4] Woodman, *op. cit.*, pp. 48–50.

consideration of the unimportant deposits that stretch all along the south shore of the Bay of Fundy, we come to the district southwest of the Cobequid Mountains in Colchester and Cumberland Counties, where a great length of siderite and ankerite occurs in close proximity to coal and fluxing material. These are very low in phosphorus and sulphur.[1] The ankerite of the Londonderry district contains both flux and ore, but its use causes such irregularities in smelting that its value is slight unless it can be mixed with other ores, such as those from the Nictaux-Torbrook field.[2]

Farther east, in the East River district of Pictou County, deposits of limonite and hematite, as a rule superior to Newfoundland ore, are spread over many miles of territory. The use of these would require carriage to Pictou Harbor — a distance of nineteen or twenty miles by rail. Mining operations are more expensive than in Newfoundland, and so these ores do not now compete with the Newfoundland ore used by the steel companies in Cape Breton.[3] Yet, proximity to the Pictou coal-fields has made them of some economic importance in the past. Many hematites are found on the shore of Antigonish County. While some of these have been exploited, they are too siliceous and too irregular to be of great value. One lead, however, may prove to be of large capacity, sufficient to justify the building of a railway to tidewater.[4]

In Cape Breton a few deposits occur. East of Whycocomagh, large amounts of hematite and magnetite are found, which, though irregular in formation, are fair in quality, and can be shipped to Sydney by water at low cost.[5] Near Little Bras d'Or Lake, and only a few miles from the blast furnaces at Sydney, irregular bodies of hematite and siderite have been located. While they are otherwise of good grade, they are apt to be high in sulphur.

[1] Woodman, *op. cit.*, pp. 146–70. [2] *Ibid.*, p. 27.
[3] J. S. Jeans, *Canada's Resources and Possibilities*, pp. 102–03.
[4] Woodman, *op. cit.*, pp. 175–206. [5] *Ibid.*, pp. 209–15.

As they are close to the waterside, they could be transported to Sydney at low cost.[1]

In general, it may be said of Nova Scotia ores that there are few large deposits of such known quality and size as would insure a large output for a sufficient number of years to warrant the erection of new iron and steel works. Many small deposits could be worked if the ore were mixed with other ores. But the grade of large deposits is low, and of small deposits, variable, and most Nova Scotia ores are particularly high in phosphorus and silicates. While the deposits are comparatively shallow, the ores require hoisting. In short, though Nova Scotia contains deposits of considerable economic value, these can be made profitable only as they complement other sources of ore supply.[2]

§ 8. Nova Scotia is, on the other hand, favored with some exceptional conditions. Limestone for flux is found in sufficient quantities throughout the Province. Still more important are the coal-fields of Nova Scotia, which are so numerous and so well distributed as to be capable of supplying fuel at a number of centers, if necessary. Cape Breton is particularly well supplied. The beds of coal at Sydney and Sydney Mines, by far the most important, occupy an area of about two hundred square miles. The conditions of extraction and shipment are very favorable. Although a great part of the field is hidden beneath the ocean, the seams can be followed beneath the sea by submarine workings.[3] The coal is of the bituminous variety with comparatively little irregularity. Some seams produce coal admirably adapted for purposes of smelting. Tests show that it is only slightly higher in sulphur than the Connellsville coal, and that the excess can be economically washed out.[4]

[1] Woodman, *op. cit.*, p. 216.

[2] *Ibid.*, pp. 8–16.

[3] Canada, *Geological Survey*, vol. XI, p. 363.

[4] P. T. McGrath, "Manufacture of Iron and Steel in Cape Breton," *Engineering Magazine*, vol. XXI, p. 375.

The Sydney coal-beds in Cape Breton are supplemented by others, in Richmond and Inverness Counties. In Richmond County, little systematic work has as yet been done.[1] Inverness County is a more important source. A series of exposed measures are found skirting the coast and extending inland a few miles and dipping under the ocean to unknown distances. Three companies are now operating these deposits. A great drawback is the lack of suitable harbors in the vicinity, but this may be overcome by building a railway along the coast.[2]

The two chief coal areas on the mainland are in Pictou and Cumberland Counties. Pictou County contains a bed covering only about fifty square miles; yet the seams are deep and the field is well situated for excellent shipping connections by rail and water. The nearest water shipments are from Pictou Harbor, ten miles distant. This field has been worked longer than any other in the Province. The coal produces coke which is excellent for metallurgical purposes.[3] In Cumberland County is found the largest coal measure of Nova Scotia. It comprises an area of approximately three hundred and fifty square miles composed of two sections, the Joggins and the Springhill districts. An excellent coke has been made in beehive ovens at Londonderry from a mixture of Cumberland and Pictou coals. The Joggins area is close to Chignecto Bay, and the Springhill section is connected with the coast by a short railway. Of eight companies operating in the Springhill district, the Cumberland Coal and Railway Company, now controlled by the Dominion Steel Corporation, is by far the most important, and the properties of the company may be considered of great value for metallurgical purposes.[4]

Nova Scotia, then, has practically inexhaustible supplies of coal, most of which may be used for making coke, and

[1] Canada, *Geological Survey*, vol. xi, p. 42, S. [2] *Ibid.*, p. 41, S.
[3] *Ibid.*, p. 43, S. [4] *Ibid.*, p. 56, S.

favorably located for use with imported ores. No part of the country is far from rail or water transportation, and many parts of the coast furnish excellent harbors, of which Sydney is by far the most important for the iron and steel industry.[1]

§ 9. In New Brunswick several ore deposits have been discovered. A few, at Woodstock, in Charlotte County, are as yet of little economic importance, either because of distance from the market, or because of the smallness or inferior character of the deposits. A large deposit found near Bathurst, on Chaleur Bay, is, however, worthy of the attention it is receiving. The mines have a daily capacity of 1000 to 2000 tons. The ores, which are of fair grade, are shipped either to Bathurst, twenty-one miles distant, or via the Intercolonial Railway to Newcastle, where ore docks have been provided. This deposit is certainly the most important source of ore in the Maritime Provinces, and may yet warrant the building of blast furnaces at Bathurst.[2]

The chief source of iron ore for use in the iron and steel industry of Nova Scotia is the well-known Wabana Mine on Bell Island, in Conception Bay, Newfoundland. The mine is the most remarkable of its kind in the world. For several years it was worked by open cut, the ore being accessible by merely stripping off the surface covering of rock and loosening the hematite by steam drill and dynamite. The upper workable bed has an area of 240 acres and a thickness of six feet. The lower bed is much larger, covering about 817 acres in sight. The beds dip downward at an angle of eight degrees, and extend under the waters of the bay. It is known that, when the ore now available is exhausted, submarine operations can provide an incalculable additional supply.[3] The cost of mining is very low.

[1] Woodman, *op. cit.*, p. 1.
[2] *Monetary Times*, vol. XLV, p. 741.
[3] McGrath, *op. cit.*, p. 376.

The ore can be placed on board steamship one mile from the mines and transported to Sydney at very low rates. While it is not so rich as the Lake Superior ores, yet it is of fair grade. It mixes readily with other ores, and its ease of mining, its abundance, accessibility, and the cheapness of transport, almost neutralize its slight shortage in mineral.[1]

The Maritime Provinces and Newfoundland are thus favored by excellent measures of coal, good fluxing materials, the presence of iron ore deposits of great commercial value and favorable conditions of transportation, all of which are together making possible the development of a great iron and steel industry.

§ 10. Even though the resources of Quebec are not so favorable as those of the Nova Scotia industry, that Province has long been the scene of iron and steel production. One possible source of supply is the iron sands of the Moisic district. These assay about seventy per cent iron and are particularly free from phosphorus and sulphur. Smelting of these ores, however, awaits the development of economical methods of concentration.[2] North of Montreal, many deposits of ore, usually of the magnetic type, have been located, but in most cases they contain so much titanium that their utilization will be postponed until some method of economical smelting is devised.[3] There are some other bodies of ore of low grade in the same district, and some containing too much sulphur or phosphorus to make them suitable for blast furnaces; yet they will probably be worked in the future when poorer grades of ore come into general use.[4]

The most important deposits in Quebec are the bog iron ore beds which are found in many parts of the Province,

[1] McGrath, *op. cit.*, p. 382. [2] Jeans, *op. cit.*, p. 106.

[3] T. J. Nicholas, "Mineral Industry in Canada," *American Review of Reviews*, vol. xxxv, pp. 714–15.

[4] Canada, *Report on the Mining and Metallurgical Industries*, 1908, pp. 469–70.

especially in Champlain, St. Maurice, and Bastican Counties. The ore is, in most cases, remarkably free from such impurities as phosphorus or sulphur, and iron made therefrom is particularly adapted to the manufacture of car wheels and special castings. These ores are being rapidly formed by an evolutionary process by which the iron is dissolved from ferruginous rocks by the organic acids in rainwater and later concentrated into cakes. The body of ore is thus constantly replaced. Yet even these ores are present in only limited amount, so that the Quebec industry must be largely dependent on outside sources of supply. The fact that Quebec is entirely lacking in coal is another limiting condition. Fuel must be supplied either from the forests of the Province, which are no longer a very satisfactory source, or from the far-distant coal-fields of Nova Scotia or Pennsylvania.[1]

§ 11. Ontario is more liberally supplied with iron ores than either the Maritime Provinces or Quebec. Probably no other part of America can claim as great an extent of rock so favorable for the occurrence of ore deposits as Ontario.[2] Northern Ontario contains rock formations similar to those found throughout Michigan, Wisconsin, and Minnesota, including iron series that are in many cases identical with those associated with the ore bodies of the American ranges.[3]

Most important of all the well-known deposits in Ontario are those in the northern part of the Province. Of these, the Helen, Josephine, and Magpie Mines, in the Michipicoten district, produce the greatest part of the ore mined in the Province. The Helen Mine deposit is approximately 200 feet deep, 400 feet thick, and 1000 feet in length; and

[1] Canada, *Report on the Mining and Metallurgical Industries*, 1908, p. 470.

[2] Jeans, *op. cit.*, p. 107.

[3] Ontario, *Report of Bureau of Mines*, 1908, p. 202.

produces a hematite of rather high grade containing little sulphur or phosphorus.[1] The Josephine Mine and the Magpie Mine, each a few miles north of the Helen Mine, contain ores of considerable, though unknown, extent, and of promising character. At Atikokan, on the Canadian Pacific Railway, west of Port Arthur, a deposit of magnetite of Bessemer grade has been located and worked. The ore is high in sulphur and requires roasting before being used in a blast furnace. This district is, however, so promising as to have warranted the expenditure of large amounts of money for exploration by important American interests.[2] East of Port Arthur, several deposits of more or less value occur. At Loon Lake, a hematite body corresponding to the Mesaba Range of Minnesota has been found. This deposit is favorably situated for transportation of ores to Port Arthur either by rail or water.[3] At Black Sturgeon River, near Lake Nipigon, hematite ore has been discovered and considerable areas explored.

The most important recent discovery is that of the Moose Mountain Range, about twenty-five miles north of Sudbury. This affords a hard, compact, magnetite containing a greater percentage of metal than the hematite of the Helen Mine. The ore, of which there is possibly twice as much as at the Helen Mine, contains little phosphorus and sulphur and no titanium. A rail haul of eighty miles brings the ore to Key Inlet on Georgian Bay. The Minnesota ores have to be hauled farther to reach Lake Superior at a point much farther west. Ore docks have been built by the McKenzie and Mann[4] interests at Key Inlet, which is a splendid harbor, capable of floating the largest Lake vessels.[5] Although there are many other

[1] C. K. Leith, "Iron Ores of Canada," *Economic Geology*, vol. III, pp. 282–83.

[2] Ontario, *Report of Bureau of Mines*, 1908, p. 69.

[3] *Engineering and Mining Journal*, vol. LXXX, 1906, p. 119.

[4] Owners of the Canadian Northern Railway.

[5] Ontario, *Report of Bureau of Mines*, 1908, p. 217.

deposits of iron in northern Ontario, few have been proved and those mentioned are as yet the only known areas of great economic value.

A few beds of ore have been located in eastern Ontario. At Radnor, in Renfrew County, a magnetite deposit of fair quality and quantity is being operated. Others are found at Wilbur, Lanark County, and at Bessemer in the northern part of Hastings County. All the ore produced at these mines is used in Canadian furnaces at Midland, Hamilton, and Sault Ste. Marie in Ontario, and at Radnor, Quebec.[1] Many other deposits occur throughout the Province, which, though not now of commercial value, might be utilized if methods of concentration, of such a nature as to make their reduction economically possible, were invented. Considerable attention has recently been devoted to such possibilities.

§ 12. In coal, Ontario is apparently entirely lacking, although it has been suggested that the many peat-bogs of the Province might supply a substitute, if a proper furnace could be invented.[2] This lack of fuel has been, naturally, Ontario's greatest drawback in the development of her mineral resources. As charcoal is no longer extensively used, Ontario is now forced to import coke or coking coal from the United States or Nova Scotia. The alternative, if she is to continue her iron and steel industry, will be to bend her efforts toward the development of the electro-metallurgic method.

It has been an axiom that the development of the iron industry of a country depends more on its richness of fuel resources than on abundance of iron ore. In the making of iron, it is usually necessary to transport the ore to the fuel. Yet this maxim is not universally applicable. The problem is rather complex and can be solved only by weighing

[1] Ontario, *Report of Bureau of Mines*, 1908, pp. 221–25.
[2] Canada, *Geological Survey*, 1863–66, p. 291.

the various freight factors involved in getting the ore and fuel to the furnace and the finished product to the market. It sometimes happens that the fuel is carried to the ore instead of the ore to the fuel. This is apt to be the case when the coal must be carried toward the market for the finished product. It would seem, then, that Ontario, with her rapidly increasing manufacturing industry of every description, can probably import coke or coal from Nova Scotia or Pennsylvania for use in her iron industries, because the fuel travels to the Ontario market and also toward the growing market of the great Canadian West.[1] Low freight rates on westward lake and railway traffic increase the possibility of importing coal or coke for an iron industry in Ontario.

§ 13. It would be strange, indeed, if the ore deposits and coal-beds of Canada were confined to the eastern and more developed portions of the country. It is well known that Labrador and Ungava[2] contain valuable and extensive ore-beds. Central Ungava contains a very large deposit of hematite and magnetite, but it is so far from transportation facilities that the utilization of the ore cannot be expected for a long time. Similar beds are found on the west shore of Ungava Bay, and on the islands along the east shore of Hudson's Bay. The long distance which these ores would have to be carried, together with the shortness of the season of navigation, is a serious obstacle to profitable working. On the other hand, the use of the abundant water-power and electrolytic methods might make possible the local reduction of the ore, providing that the prospective Hudson's Bay Railway opens an ever-increasing market in the Canadian West.[3]

[1] Ontario, *Report of Bureau of Mines*, 1908, pp. 199–201.

[2] Now northern Quebec.

[3] A. P. Law, "The Iron Ores of the Labrador Peninsula," *Engineering Magazine*, vol. XIX, p. 205.

§ 14. Enthusiastic Westerners have sometimes declared that the West itself may some day develop an iron and steel industry. Evidence presented before the Senate of Canada shows that there are large deposits of ore along the McKenzie River, and it is well known that Alberta contains enormous resources of low-grade coal and some of excellent coking quality.[1] The resources on the mainland and islands of British Columbia are better known. On the mainland, ores are found in several districts. At Cherry Bluff, near Kamloops, an out-crop of ore appears. Up to the present, however, the ore has been used for fluxing purposes only, at Nelson, Tacoma, and Revelstoke.[2] A deposit of red hematite of considerable quantity has been found in the Cariboo district, but it is too remote from railroad and other means of communication to be of great commercial value.[3] A few other deposits have been located on the mainland, but they are usually of little economic value because of lack of transportation facilities, or because they are of inferior quality or small in quantity.

If British Columbia is to have any important iron and steel industry, it must, therefore, look to other more available resources on the coast, and these may possibly be found on Vancouver and Texada Islands. Vancouver Island offers several important resources. There are a few properties of which the surface indications are so promising that the deposits may become the object of development in the near future. Among these are the deposits at Sooke Harbor, near Victoria, those near the Gordon River, those on Copper Island, those near Barkley Sound, those near Head Bay, and especially those on the Klaanch River. Some ores are too irregular; others are not sufficiently extensive. Few are far from water transportation, and excellent harbors are furnished by the numerous indenta-

[1] Canada, *Canada's Fertile Northland*, 1907, p. 20.
[2] Canada, *Report on the Mining and Metallurgical Industries*, 1908, p. 216.
[3] *Ibid.*, p. 219.

tions of the coast. In general, the ores varying from 52 to 66 per cent in metal are of very satisfactory grade. Phosphorus is not present in prohibitive quantities, as a rule, but the percentage of sulphur often necessitates roasting the ores previous to their reduction.[1]

Besides these somewhat undeveloped ores of Vancouver Island are the well-known deposits of Texada Island. There is every probability that large quantities of merchantable magnetite exist here. The known deposits are situated close to the water-front, and a little bay offers good shipping facilities. From none of the claims has the ore to be transported more than a mile and a half to water. The ore ranks high in quality, containing from 59 to 64 per cent of iron, while the phosphorus content is very low. The high proportion of sulphur, the only objectionable feature, is removable by roasting.[2]

Nor is British Columbia unsupplied with fuel. On Vancouver Island there are now two coal companies in active operation capable of producing a large output, if necessary. One of them also produces coke of splendid metallurgical qualities. As the coal-beds are near tidewater, coal can be quickly and cheaply transported to the market. There are also many beds of coal on the mainland. For the present, however, the Crow's Nest Pass district has the monopoly of coking coal, since the coal from other beds contains too much sulphur to produce coke of the desired quality.[3] Of course, this district includes the Lethbridge district of Alberta, opened several years ago by the southern branch of the Canadian Pacific Railway.

§ 15. Information concerning the extent and character of Canadian iron ore deposits is necessarily fragmentary,

[1] E. Lindemann, *Iron Ore Deposits of Vancouver and Texada Islands*, pp. 8–21.

[2] *Ibid.*, pp. 21–24.

[3] Canada, *Report on the Mining and Metallurgical Industries*, 1908, pp. 261–64.

since comparatively little work of investigation has been carried on as yet. It is quite impossible to give figures which will convey even an approximate idea of what may be called iron ore reserves. In older countries the study of iron ore deposits has been conducted for years, even centuries, and in such cases it is justifiable to present figures which may be claimed to represent close approximations. But until lately Canadian deposits have not attracted the attention to which they seem entitled, and the information available is on the nature and character of ores and on the modes of occurrence as shown by surface indications, rather than on the volume and extent of ore supplies as shown by systematically conducted studies of actual workings and developments. A beginning in the direction of systematic surveys was made by the inauguration of the Mines Branch of the Dominion Department of Mines, under the direction of Dr. Eugene Haanel.

There is very little doubt that Canada's failure to take her place among the important iron ore-producing countries of the world is due to the lack of knowledge concerning its iron resources, and, to a certain extent, to the comparatively limited home market, rather than to lack of workable deposits. By far the greater part of Canada's 3,600,000 square miles is "terra incognita" as regards its mineral resources, or even its general geological features. The futility of attempting even roughly to estimate Canada's share in "an approximation of the world's supply of iron ore" is apparent. The deposits reviewed so briefly are all in the older and more or less settled and known regions. New iron ore-bearing districts will almost certainly be discovered as the settlement of the country proceeds, and it is not improbable that they will prove to be incomparably larger than the present known resources.[1]

[1] *The Iron Ore Resources of the World*, 1910, pp. 719–22.

PART TWO

THE IRON INDUSTRY OF CANADA PRIOR TO THE ADOPTION OF THE NATIONAL POLICY IN 1879

CHAPTER III

THE HISTORY OF THE INDUSTRY

§ 1. As we have already suggested, the history of iron smelting in Canada has not been, until the last few years, a brilliant one. The industry had an early beginning, however, and unceasing efforts have been put forth to establish it permanently on Canadian soil. Yet many of these attempts have resulted in failures. The story of the failures and the successes, their causes and conditions, prior to the establishment of the national policy in 1879, is the theme of the two following chapters. For convenience a chronological treatment of the history of the industry in the different Provinces will be followed.

§ 2. As with most "first things" in Canada, the first iron furnace was located in Quebec. Although the manufacture of pig iron in Quebec has never assumed any great importance, from very early periods pig iron of high quality has been produced in the French Province.

The earliest attempt at production on record is that carried on for a long period of years at St. Maurice Forges, near Three Rivers, on the St. Lawrence River. Ore was discovered there as early as 1667, and was probably known earlier to the Indians and Jesuits. Colbert, anxious to discover iron ore in New France, had caused some explorations to be made in 1667, resulting in the discovery of deposits at Three Rivers, but they were reported as offering nothing advantageous in either quality or quantity.[1] In

[1] F. C. Wurtelle, "Historical Record of St. Maurice Forges," *Proceedings and Transactions of the Royal Society of Canada*, vol. IV, sec. 2, p. 78. For the geographical location of the plants mentioned see the maps in the Appendix.

1672 Count de Frontenac reported that he had commenced to mine ore, and strongly urged the establishment of forges and a foundry.[1] In 1685 French ironworkers declared a sample to be of good quality and percentage.[2] Another report, in 1706, urged the development of these natural resources. Lack of skilled workmen and suitable water power, and the absence of a sufficient market for the product, seem to have postponed further developments.

It was not until 1730 that Louis XV gave a royal license to M. Francheville to work the iron ores of the St. Maurice vicinity and advanced ten thousand livres for aid in erecting a furnace. However, deeds and rights were surrendered to the Crown in 1735. In 1736 Cugnet et Compagnie, or La Compagnie des Forges, were advanced ten thousand livres and were empowered to erect ironworks on condition that a blast furnace be built immediately.[3] When, in 1737, Cugnet et Compagnie claimed that they were in want of wood and that if they had to buy it from the *habitants* they would be compelled to pay ruinous prices, the intendant granted them the fief of St. Étienne[4] for a time. The firm made cannon and mortars, iron stones, kettles and bars, and also tried to make steel, but could not bring it to perfection because no one was acquainted with the best method of preparing it.[5] In 1739 they brought from France a skilled artisan who possessed knowledge of the different branches of manufacturing wrought and cast iron, as well as of the working of mines, and the works and methods of working were improved. Finally, the company, through lack of capital, was forced to give up.

When, in 1743, the Crown again took possession, the works were operated on the king's account. Skilled work-

[1] J. H. Bartlett, "Manufacture of Iron in Canada," *Transactions and Papers of American Institute of Mining Engineers,* 1895, pp. 508–10.

[2] J. M. Swank, *Iron in All Ages,* p. 348.

[3] Bartlett, *op. cit.,* pp. 510–11.

[4] Wurtelle, *op. cit.,* p. 80.

[5] Peter Kalm, *Travels in North America,* vol. III, p. 89.

men were sent out from France, the blast furnace was partly rebuilt, and additions were made. When the forges were visited by M. Franquet in 1752, they had assumed very considerable proportions.[1] Water power ran the machinery and about 180 French soldiers of the Three Rivers garrison were the principal workmen. The ore used was rich and tolerably clean. Charcoal, the only fuel, was secured in the neighborhood in great abundance. The boiling metal was put in a gutter of sand and moulded into stoves, pots, and kettles, or cooled and hammered into bars. The iron was of excellent quality, soft, pliable, and tough.[2] M. Franquet dwelt on the necessity of greater economy at the forges and the advisability of sending out more competent operatives and furnace-men from France. As improvement was effected in the manufacture of iron between 1752 and 1759, many of his suggestions probably were acted upon. Yet a great number of useless people on large salaries, such as a director, a comptroller, a treasurer, a contractor for the forges, several overseers, a chaplain, and others, besides waste and extravagance combined with fraud, connived at by those who passed the accounts, rendered the establishment unprofitable and even burdensome to the Crown.[3]

Moreover, the forges produced more iron than the colony could consume, and, although some was exported to France, the authorities were not convinced that it was fit for fire-arms. A naval establishment for Canada, and the use of iron in composite shipbuilding, were proposed. Though orders were given for the erection of docks at Quebec, nothing was actually accomplished.[4]

In 1760 Canada, and with it the St. Maurice Forges, passed into the possession of Great Britain. For one hun-

[1] Bartlett, *op. cit.*, p. 511.
[2] Swank, *op. cit.*, p. 350.
[3] Wurtelle, *op. cit.*, p. 823.
[4] Bartlett, *op. cit.*, p. 515. Quoted from Russel's *History of North America*, bk. IV, p. 372.

dred years the forges were leased to various companies and operated with more or less success.[1] From 1761 to 1763 they were used for converting unserviceable ordnance into bar iron. Production was usually carried on to advantage, but it was a troublesome undertaking not congenial to military men.[2] The works may or may not have been operated down to 1767, when the Crown leased the tract of land and plant for sixteen years at a rental of £25 per annum. Repairs were made, buildings erected, and a great quantity of iron was turned out with success.[3]

It appears that, when the American invasion of 1776 occurred, one member of the partnership helped the invaders with both goods and money. He cast shot and shell to be used in the siege of Quebec and finally ran off to the United States, taking with him all the funds and the vouchers for the goods advanced to the Americans. Having cashed the vouchers, amounting to about $10,000, he sailed for France. The company, however, managed to recover by dint of hard work, and continued operations till the expiration of its lease.

In 1783 the works were again leased for a sixteen-year period, and subsequently passed through the hands of a series of partnerships.[4] In 1809 the manufacture of iron was the most important manufacturing industry in the country, and there was a considerable export of cast-iron articles, particularly stoves.[5] In 1831 the establishment consisted of every convenience, furnaces, forges, foundries, workshops, houses, and other buildings. Supplies to be used in the Province, such as large potash kettles, machines for mills, various kinds of casts, a superior quality of wrought iron, were the principal articles manufactured, and a quantity of pig and bar iron was produced for exportation. Two hundred and fifty to three hundred men were

[1] Wurtelle, *op. cit.*, p. 84.
[2] Bartlett, *op. cit.*, pp. 515–16.
[3] Wurtelle, *op. cit.*, p. 85.
[4] Bartlett, *op. cit.*, p. 516.
[5] Hugh Gray, *Letters from Canada*, p. 22.

employed in the works. Of these the overseers and employees in the model department were English and Scotch, and the unskilled workmen generally Canadians.[1]

In 1846 the Crown sold the forges to Henry Stuart, of Montreal, who, in turn, leased them to James Ferrier by whom they were worked until 1851. Stuart then sold his interest to Andrew Stuart and John Porter, of Quebec. These men abandoned the enterprise because of the growing scarcity of ore and charcoal in the neighborhood. When Henry Stuart had purchased the property, he paid very little down, and the balance was never paid. In 1861 the Crown therefore sold the property, together with a farm, for $7000. The purchaser sold the furnace, works, houses, cottages, and water privileges for $1700 to John McDougall in 1862, and he sold the land to squatters and settlers, who supplied the ore and wood to the forges, which Mr. McDougall once more put in operation. As the product was used chiefly for the manufacture of car wheels, the trade in stoves and kettles fell off.[2]

In the seventies, however, ore of inferior quality had to be used, and the wood yielded an unusually small amount of charcoal. The supply of bog ore which had to be drawn from four to nine miles was almost exhausted by 1874. Limestone had to be carried several miles at a cost of one dollar per ton. While the iron, soft, tough, clean and close in texture, and possessing fine chilling qualities was of undoubted merit and in great demand for making car wheels and axles, the supply of ore and wood was rapidly disappearing. An attempt to smelt the magnetites of Leeds County was unsuccessful because the furnace was not the proper kind and the operators were inexperienced in treating other than bog ores.[3] Consequently, although the furnace was still making good charcoal iron in 1879, it was

[1] Bartlett, *op. cit.*, p. 516. [2] *Ibid.*, p. 517.

[3] J. B. Harrington, "Notes on Iron Ores of Canada and their Development," in Canada, *Geological Survey*, 1873–74, p. 248.

abandoned in 1883, at which time it was the oldest active furnace on the continent.[1]

Although writers have always given special attention to this historic endeavor at St. Maurice, nevertheless, many other attempts to smelt Quebec's numerous ores have been made. In 1798 a blast furnace, casting house, two forges, workshops, and dwelling houses were built on the east side of the Bastican River, in Champlain County. They were in operation for some time. Reports show that both ore and wood were more plentiful than at St. Maurice, but the proprietor died and the plant was abandoned.[2] In 1857 the Canada Iron and Manufacturing Company of Montreal built a blast furnace at Hull, near Ottawa, and for two years produced a superior quality of pig iron; but because of the high cost of charcoal, excess of sulphur in the ore, and improper management, the economic results were not satisfactory. Operations were stopped, and the furnace, having been much injured by a forest fire, was abandoned a few years later.[3]

About the same time the Radnor Forges, at Fernion in Champlain County, approximately ten miles from Three Rivers, were erected by Messrs. Larue and Company. The establishment consisted of a blast furnace, forge, and large rolling mill, a car-wheel foundry in Three Rivers, and 40,000 acres of freehold timber and ore lands. The crude bog ore which was brought to the furnace, partly by the workmen of the company, and partly by the farmers on whose land it was found, yielded 40 to 50 per cent metal, when washed free of adhering earth. Limestone, secured in the vicinity, was used as flux. A refractory sandstone was used for the furnace hearths. In 1863 about 2000 tons of cast iron were produced. In digging up and bringing the ore to the furnace and in preparing and transporting the charcoal about 200 to 400 men were employed.

[1] Swank, *op. cit.*, pp. 350–51.
[2] Bartlett, *op. cit.*, p. 518.
[3] Harrington, *op. cit.*, pp. 73–74.

The chief product of the company was cast-iron wheels for railway cars. For this the metal was very well adapted. Wrought iron was also produced. When the rolling mill and forges were destroyed by fire, only the forges were rebuilt, and the iron was sent to the car-wheel foundry at Three Rivers.[1] The lack of railroad facilities, which prevented supplies from being carried more than seven miles, and which handicapped the proprietors in finding a market for the product, together with bad management and disastrous fires, contributed to the failure of the plant in the early seventies.[2]

In 1867 the Moisic Iron Company was formed to work the iron sands on the north shore of the Gulf of St. Lawrence. As Mr. Molson, of Montreal, had treated the ore successfully by the bloomary process in northern New York, he erected several bloomary furnaces at Moisic, near Montreal. Iron sands were used as ore, and charcoal as fuel. The product was sent to the United States or used at Montreal at a rolling mill built by the company in 1874. But in June, 1872, following a protest from American ironmasters, a duty of $15 per ton was placed on Moisic iron at a time when the rate on ordinary pig iron was reduced from $7 to $6.30 per ton.[3] Before the special duty was repealed in 1875, and Moisic iron admitted at the ordinary rate,[4] the company was compelled to shut down the plant and to go into liquidation. At this time there was no demand in Canada for a large output of this class of iron. Since the importation of British goods was seriously depressing the market,[5] and there was a downward movement of prices in the United States, the price of iron fell rapidly in Canada after 1873.[6]

[1] Canada, *Geological Survey*, 1863, pp. 686–87.
[2] *Canadian Engineer*, vol. II, pp. 4–5.
[3] *United States Statutes*, vol. 17, chap. 315, secs. 4–5.
[4] *Ibid.*, vol. 18, chap. 36, sec. 6.
[5] Bartlett, *op. cit.*, p. 521.
[6] See Appendix H. No. 1 foundry pig iron fell in price from $42 a ton in 1873; to $30 in 1874; to $25 in 1875.

The St. Francis River Mining Company erected a blast furnace in the county of Yamaska, near Rivière aux Vaches in 1869, and produced charcoal pig iron until 1873. The property was purchased by Messrs. McDougall and Company, and operated till 1880, when, owing to the exhaustion of the bog ores within paying distance from the furnace, it was dismantled.[1]

In the winter of 1873 the Haycock Iron Mine, eight miles northeast of Ottawa, was opened, and 5000 tons of ore raised. Works, consisting of a bloomary forge, a steam hammer, engines, pumps, workmen's cottages, and a sawmill, were built. Some blooms of fine quality were made and exported to England, but for some reason the enterprise was not a commercial success and the place was soon closed.[2]

The Canada Titanic Iron Company, formed as the result of the discovery of titaniferous ore about sixty miles below Quebec in 1871, built two blast furnaces, extensive buildings, and a railway from the works to Baie St. Paul, in 1873.[3] Good pig iron was made, but the enterprise was not a profitable one.[4] Not only was the ore high in sulphur, phosphorus, and chromium, but the titanium proved to be of no special value to the iron and necessitated the use of 190 to 200 bushels of charcoal per ton of pig iron produced. An admixture of other ores was necessary to reduce the proportion of titanium and the consumption of fuel.[5] Instead of producing 60 tons a week, as was expected,[6] the first furnace produced only 26 tons of pig iron in the first week, 20 tons in the second, and 18 in the third. The enterprise was soon abandoned, and the plant was dismantled in 1880.[7]

[1] Bartlett, *op. cit.*, p. 520.
[2] *Ibid.*, p. 522.
[3] Harrington, *op. cit.*, p. 251.
[4] *Journal of the Iron and Steel Institute*, 1876, no. 1, p. 190.
[5] Harrington, *op. cit.*, p. 251.
[6] *Journal of the Iron and Steel Institute*, 1874, no. 1, p. 184.
[7] Bartlett, *op. cit.*, p. 520.

Another blast furnace, built by Messrs. McDougall & Company, at L'Islet, about four miles from their works at St. Maurice, was abandoned before 1879.[1]

In 1870 another attempt was made to smelt the iron sands of Quebec. Steel-works were erected in Quebec for the direct manufacture of steel from these high-grade ores. A well-constructed Siemens regenerative furnace was used. In making steel, the sand, purified by a magnetic concentrating machine, was mixed with tar and charcoal powder in a box and the mixture was pressed into square bricks. These were then piled upon the furnace hearth and melted down to steel, which was finally tapped off into ingots. Difficulty seems to have been experienced in obtaining a regular and homogeneous product. Pouring gave a good deal of trouble. The ingots were frequently honeycombed, and the forge products were liable to contain flaws. The defects which led to failure would have been evident to a skilled metallurgist, and might have been overcome by him, but these operations were conducted by a man who knew nothing either of the theory or practice of steel-making. As a consequence, nothing was accomplished and the works were abandoned.[2]

§ 3. Ontario has endeavored to establish the iron industry at several periods in her history. The first attempt to manufacture iron was made as early as 1800 at Lyndhurst, then called Furnace Falls, on the Gananoque River, in Leeds County. Water power was used to drive the machinery and to work the blast. The ore, which had to be drawn a considerable distance, was of inferior quality and insufficient quantity. At one time an attempt was made to cast pots and kettles for the use of settlers. After two years' trial, the venture proved a commercial failure and was given up. A forge for the manufacture of bar iron, built at about the same time for the same company, was in opera-

[1] Bartlett, *op. cit.*, pp. 521–22. [2] *Monetary Times*, vol. II, p. 502.

tion until 1812. On account of the lack of capital and derangement of business during the war, the place was shut down and never opened again.

The next attempt was made in western Ontario at Normandale (then known as Potter's Creek), in the county of Norfolk, near Lake Erie. In 1815 John Mason, an Englishman, started to build a furnace to smelt the bog ores of the district. A creek furnished all the required power, and Lake Erie was convenient for shipping the product to any ports along the shore, or for receiving any supplies that might be required. Moulding sand was abundant on the site of the furnace and a great variety of timber for charcoal was easily obtained. The high price of iron was another favorable incentive. But the bog ore was widely scattered in very small bodies. Further, it required many experiments to know the best method of working the ore, and, in addition, the few men in the country capable of working the furnace were independent and unruly. Unfortunately, the Government gave no aid, and when, after a few tons of iron had been produced, the inner wall of the furnace gave way, the project was temporarily abandoned.

In 1820 the property was purchased by Mr. Joseph Van Norman, who, in 1821, formed a partnership and built a new blast furnace at an expense of $8000. The product was of excellent quality. With eight or nine tons of bog ore secured from the marshes and swamps within a distance of twelve miles, about three tons of pig iron were produced. The furnace, which was in blast about eight or nine months per year, running night and day, produced 700 to 800 tons of iron at an annual consumption of 4000 cords of hardwood made into charcoal in the usual way.

In the early stage of the enterprise, the iron was converted into various kinds of castings, for there was no market for the pig iron. Even before the opening of the Welland Canal in 1829, stoves, kettles, and other iron goods were sent very long distances, particularly in

winter. The wares produced were disposed of along the shores of Lake Erie and taken into the interior by teams. Afterward towns on the canal and ports on Lakes Erie and Ontario were accessible by water and two vessels were kept busy during the summer months. Hamilton, Toronto, and Port Hope were thus supplied, and from these centers wares were distributed into the back country. Some goods were sent as far as Montreal. Since the country was overstocked at times, some of the product was exported to Buffalo and even to Chicago, as well as to other Lake ports. The business seemed to be suited to the Province and was started at the right time to be of use to the new settlers in furnishing sugar-kettles and kettles for boiling ashes. There was in those days little money in the country, and business was carried on largely by barter. Anything the people had to sell was brought to the furnace and exchanged for the wares, or due-bills payable in ironware. At one time the books of the establishment showed outstanding over $30,000 of these due-bills for iron.

In 1826 Mr. Van Norman bought out his partners in favor of his brother. The business was carried on till 1847, when the plant was abandoned, because of the exhaustion of fuel and ore in the neighborhood. The firm also owned a forge at Port Dover, where for some years bar iron for horse- and sleigh-shoes[1] was manufactured.

The township of Marmora, in Hastings County, has long been noted for its iron ores. Ironworks were first started there about 1830 by a Mr. Hayes, who, after spending a fortune, gave up the property to his creditors. The works were carried on for a time in the interest of the Honorable Peter McGill, the chief creditor, but at a heavy financial loss. In 1847 Mr. Van Norman visited the works, and, tempted by the appearance of great ore-beds, purchased the property for $21,000. After a large sum had been expended in fitting up the furnace, putting in machinery,

[1] Bartlett, *op. cit.*, pp. 524–27.

ovens, blowing apparatus, erecting and repairing buildings, cutting cordwood and making it into charcoal for fuel, the furnace was finally started in 1848. The result was a bitter disappointment; for, after being accustomed to using an easily reduced bog ore, Mr. Van Norman now had to treat a hard, though rich, rock ore. A large amount of charcoal had to be used and nothing but loss attended every effort. After the iron was made, it had to be carted thirty-two miles to Belleville, over roads so rough that the wagons were constantly in danger of breaking down. A road was therefore opened to Healey's Falls on the river Trent, a distance of nine miles; and the iron was taken from there to Rice Lake by steamboat and then carted twelve miles to Cobourg on Lake Ontario.

At this time iron ranged in price from $30 to $36 per ton, and found a ready sale at these prices. In 1848 a rapid drop in the price of iron in England, together with the reduction of transportation rates that followed the opening of the St. Lawrence canals, settled the question of making pig iron at Marmora for Mr. Van Norman, who had to stop the works and lost most of his investment.

The next proprietors were local people from Belleville who formed the Marmora Foundry Company. Many improvements were made at an expense of probably $20,000. Pig iron of very superior quality was produced at a cost not exceeding $15 per ton. The ore was rich; and three tons yielded a ton of iron. Excellent as was the cast iron made from it, the toughness and ductility of the pig iron made it still more suitable for making bar iron. But owing to some difficulty over the payment of stock dues by certain stockholders, the works were stopped after the first experiment.

In 1856 an English company came into the field. Mr. Vernon Smith, who had just left furnaces at Woodstock, New Brunswick, was in charge. He rebuilt the old furnace and built a new one cased with iron. But apparently the manager did not know how to treat the ores and the plant

was constantly behind the times. When the hotblast treatment and other new processes were materially reducing costs in Great Britain, the old mode of smelting by cold blast was continued here; the manufacture of bar iron was attempted without the use of much machinery. The proprietors could not compete with imported products of British ironmasters who carried on their operations on a large scale, using coal and improved machinery.[1]

One of the furnaces was again put in blast by a Mr. Bentley but remained in operation only forty days. Mr. Bentley's plan to produce castings at a cost of $37.50 and to sell them for $60 per ton could not be put into practice.[2]

In 1867 the property passed into the hands of a Pittsburg Company, and for some years ore was shipped to Pittsburg.[3] Iron-making at Marmora was ended by reason of the high cost of transportation, inefficiency of production, and competition and low prices in the market.

Meanwhile, a furnace to smelt bog ore was erected in Essex County. Sufficient quantities of ore were found within a distance of five miles. The ore was melted with a mixture of hardwood and charcoal. Stoves, ploughs, and potash kettles for the settlers were made at a foundry near the furnace. The plant was operated until 1838, when it was abandoned through lack of funds and ores.[4]

In 1837 a blast furnace was built at Marmora to use the iron ore of Madoc Township, Hastings County. The iron produced was made into implements, ploughs, potash kettles, and similar settlers' stores. A drop in the price of iron, together with a lawsuit, caused its abandonment in 1844.[5]

We again hear of Mr. Van Norman in connection with the iron-works built at Houghton, Norfolk County. After his failure at Marmora he returned to Normandale. About

[1] Ontario, *Report of Royal Commission on Mines*, 1890, p. 322.
[2] Canada, *Geological Survey*, 1863, p. 109.
[3] Bartlett, *op. cit.*, p. 53.
[4] *Canadian Mining Manual*, 1897, pt. 11, p. 64.
[5] Ontario, *Report of Royal Commission on Mines*, p. 389.

this time the Great Western Railway was under construction. Messrs. Fisher & McMaster, of Hamilton, who were furnishing car wheels to the railway company, were having a great deal of trouble in getting suitable charcoal iron. As the iron formerly made at Normandale was just the kind needed, they offered Mr. Van Norman $45 per ton for all the iron he could make, provided the iron was suitable for the manufacture of car wheels. As soon as sufficient bog ores were located in Norfolk County, a blast furnace was built, and it was put into operation in 1854. In the following spring 400 tons of iron were shipped, but the iron, on being tested, was rejected because it would not chill. It had to be sold elsewhere for only $22 per ton, which was below the cost of production. The works, which had cost about $30,000, were abandoned, and Mr. Van Norman's career in the iron business was ended.[1]

This was the last blast furnace in operation in Ontario previous to 1895. In the mean time, however, several proposals were advanced. In 1873 a company was formed to purchase the Haycock Iron Mines and to erect a blast furnace and Bessemer converters for making steel.[2] In 1875 attempts were made to smelt iron ore with crude petroleum in one of the Marmora furnaces, but they were not economically successful.[3] Between 1876 and 1879 the Peterboro, Cobourg, and Marmora Railroad and Mining Company applied to the Ontario Assembly for power to acquire land, erect furnaces, and manufacture iron, but the ore was all exported to the United States until 1877, when, because of a falling off in the demand, it was piled at the mouth of the mine.[4] Between 1878 and 1879 a large English firm was making arrangements in Toronto to secure a lease of land on which to manufacture iron.[5] In 1879 a company was

[1] Bartlett, *op. cit.*, p. 531.
[2] *Journal of the Iron and Steel Institute*, 1873, no. xi, p. 457.
[3] *Ibid.*, p. 595.
[4] *Ibid.*, 1876, p. 186.
[5] *Monetary Times*, vol. xii, p. 720.

formed to construct and maintain blast furnaces for the smelting of iron ore and manufacture of iron at Port Hope and elsewhere in Ontario.[1] As no proposal apparently led to any permanent results, Ontario had no iron plant in operation in 1879.

§ 4. Coal and iron ore were discovered in the Maritime Provinces as early as 1604, but it was not until the third decade of the nineteenth century that a small quantity of bar iron was made in a Catalan forge from the ores at Nictaux.[2] In the year 1825 an association, called the Annapolis Mining Company, was formed with a capital of £100,000 to manufacture iron at Clementsport, in Annapolis County. Besides a single liability clause as protection to shareholders, the Government gave two bounties of £600 each for the manufacture of a certain quantity of pots, kettles, and bar iron, as further encouragement. The associates purchased an extensive and valuable vein of ore situated about three and a half miles from the mouth of the Moose River and another of equal importance in the upper part of Annapolis county. A large smelting furnace, coal houses, and stores were built for £30,000. The extensive forest at the head of the river supplied an abundance of charcoal, which alone was used for fuel. Smelting and casting went on favorably, as the iron produced proved excellent both for foundry work and for refined bar iron. But since the product had to compete with English wares, much depended on the economy and skill with which the establishment was managed.[3] Unfortunately, the company employed inexperienced and unskilled men, not practically acquainted with the manufacture of iron. With a powerful blast, a large furnace, and the best charcoal, not more than 13 tons of cast iron a week could be produced.[4] Moreover, as the ore

[1] *Monetary Times*, vol. XII, p. 720.
[2] Nova Scotia, *Mines Report*, 1877, p. 43. [3] *Ibid.*, p. 43.
[4] Abraham Gesner, *Industrial Resources of Nova Scotia*, p. 257.

was of poor grade, it produced a poor quality of iron unless it was mixed with other ores. Limestone had to be secured from St. John, New Brunswick.[1] After the works had been in operation a short time, they were suddenly closed, partly for political causes.[2]

They remained closed for thirty years, until in 1861 operations were resumed for a short time. Little is known of the work for the next decade, except that in 1872 about one hundred tons were produced and shipped to Boston. In 1873 the plant was operated for six weeks, and in 1874 it passed into the hands of the New York-Nova Scotia Iron and Coal Mining Company. Apparently no iron has been produced in the section since that time.[3]

The next early attempt at iron-making in the Maritime Provinces was made in 1827, when the General Mining Association opened coal mines at Stellarton, Pictou County. One thousand pounds was laid aside for an experiment in iron-making. A foundry and a furnace were built in 1829, and the smelting of several ores, mostly red hematites, was attempted.[4] The furnace-man in charge was an Irishman experienced in the trade, brought over from Great Britain, but he had great difficulty in getting the metal to flow. Although eight tons of iron were made daily, an excess of phosphorus and lack of silicon made it hard and useless for foundry purposes. After fifty tons had been made, the men got drunk one night and left the furnace to take care of itself, which it did for all time to come. In the morning the furnace was cold and the metal a solid mass.[5]

New Brunswick, too, was the scene of early endeavors in the iron industry. In 1836 an iron ore-bed was discovered at Woodstock, Carleton County. About 1848 the York

[1] Harrington, *op. cit.*, p. 255.

[2] Nova Scotia, *Mines Report*, 1877, p. 43.

[3] Woodman, *op. cit.*, p. 40.

[4] H. S. Poole, "Iron Making in Nova Scotia," *Canadian Mining Review*, vol. XII, p. 204.

[5] *Canadian Engineer*, vol. II, p. 104.

and Carleton Mining Company obtained from the Provincial Government a subsidy of 10,000 acres of picked land and expended $30,000 on a blast furnace. Within a year or two the works were injured by fire. Repairs were made, however, and the plant again put in operation until an explosion wrecked the furnace and buildings and ruined the company. The works were rebuilt by an English firm and remained in operation for eighteen months during which time 1000 tons of iron were made and shipped to England. In 1862 the property passed into the hands of the Woodstock Charcoal Iron Company. White pig iron was made and exported to England for use at Sheffield in the manufacture of armor plates. The iron is said to have been of superior quality, but the cost of production was too great. The ores, besides being difficult to concentrate, were very lean, and contained a large proportion of phosphoric acid and sulphur. The beds were irregular and were soon worked out.[1] The place was shortly abandoned, and New Brunswick has never since attempted to smelt ores.

In 1856 two furnaces were built at Nictaux Falls, north of Digby, Nova Scotia. But they did not remain in blast for any considerable time because the phosphoric content of the ores reduced the quality of the iron. By 1874 the people of the neighborhood who wished to obtain brick had partly torn down the furnaces.[2]

In 1860 a blast furnace was put in operation at Bloomfield, south of Digby, to smelt the bog ores of that district. It was in blast several times prior to 1880.[3]

Following a favorable report on the iron deposits in the Cobequid Mountains in 1845, ironworks, consisting of Catalan forges, one puddling furnace, one heating furnace, one furnace, one metal helve, and one blower, together with ore-crushing rolls, were built at Londonderry, Nova Scotia, in 1850. The rolls and blower were driven by water power

[1] Bartlett, *op. cit.*, pp. 535–36. [2] Harrington, *op. cit.*, p. 526.
[3] Bartlett, *op. cit.*, p. 539.

until 1858. A small quantity of bar iron was made, but only until 1853, when a charcoal iron furnace was put in blast. The ores used were nearly all a pure peroxide of iron found in the neighborhood. Large tracts of forest supplied almost any quantity of hardwood for making charcoal. The iron produced proved to have ductility, high powers of resistance to strain, and adaptation to all those processes by which the finest kinds of iron and steel are made.

Londonderry is situated on the west branch of the Great Village River, immediately on the ore deposits. The nearest shipping point was six miles distant at Great Village, with which there was no means of communication except by wagon. The home market was too small for the whole output, and iron for export had to be carried to Cobequid Bay, on which navigation is dangerous owing to the rapidity of the tides. As the importance of obtaining railway communication was very great, the owners exerted themselves to get the Intercolonial Railway as close to the plant as possible. This railway, although not built direct to the blast furnace, was a distinct advantage to the company, not only through purchases of its output, but also by aiding it to ship the product to more distant markets. It also brought the iron ores of Nova Scotia into closer connection with the coal-fields of Cumberland and Pictou Counties. So long as charcoal was the only fuel available, the scale of operations had been confined to dimensions quite out of proportion to the supplies of ore.

In 1873 the Steel Company of Canada was formed to purchase these Londonderry and Acadia mines and ironworks. The manufacture of steel by the Siemens open-hearth process,[1] steel rails, cast steel, and spring steel, was proposed. The company expended $2,500,000 in prospecting for and raising ore, in building modern rotatory furnaces, a melting furnace with regenerative gas furnaces,

[1] *Journal of the Iron and Steel Institute*, 1873, no. 1, p. 204.

and in building houses for workmen. It also acquired the right to use the Siemens open-hearth process in Canada, built ten miles of railway from the mines to the plant, and made an agreement with the Intercolonial Railway for the right to use its lines.[1]

In 1874 Dr. Siemens, who was chairman of the company, made his first commercial experiment in the direct conversion of iron into steel, but failed unfortunately.[2] When, in 1876 and 1877, coke ovens were built, to use coal from the Albion Mines, and the first coke blast furnace erected, the old furnaces and the steel plant were razed and a new rolling mill put up on their site.[3] Thus, the plant at Londonderry was in 1879 the most pretentious endeavor that had ever been made in the iron and steel industry of Nova Scotia.

A few years earlier the Pictou Coal and Iron Company had been formed to mine coal and iron ore, to manufacture iron, and to construct a railway from the mines to some point on the Intercolonial Railway. Extensive explorations were carried on and valuable discoveries of Bessemer ore were made. But the company could not raise sufficient capital; progress was checked, and the once bright prospect faded away.[4]

§ 5. Besides the early attempt to establish the manufacture of the primary products, pig iron and steel, in Canada, the manufacture of finished goods had already been introduced. Incidentally, it has been noted that many of these plants carried the manufacture on to the finished stage. The plant at Lyndhurst produced bar iron as early as 1800; those at St. Maurice and Normandale produced kettles and other casts demanded by the early settlers.

[1] *Journal of the Iron and Steel Institute*, 1875, no. II, p. 596.
[2] Woodman, *op. cit.*, p. 153.
[3] Canada, *Report on Mining and Metallurgical Industries*, 1908, p. 539.
[4] *Canadian Engineer*, vol. II, p. 104.

The plant at Londonderry adopted the same policy. It is important to note that it was those plants which carried the process through to the finishing stage that had the greatest success and permanence.

But in the last two decades of the period with which we are dealing, the tendency to build separate plants turning out finished products alone became widespread. The manufacture of many of the more highly finished products of iron and steel, such as boilers, engines, springs, axles, edge tools, foundry work, tacks, rivets, bolts, and nuts was gradually developing with the progress of the country, and assuming some importance. Our attention may, therefore, be turned for a moment to the rolling-mill industry.

Like the other branches of the iron industry, the rolling-mill industry seems to have appeared in Quebec earlier than in the other Provinces. Previous to 1851 English wrought nails were used almost exclusively in Canada. The manufacture of cut shingle nails had been started in Montreal, yet the larger cut nails were still imported into Upper Canada from the United States. But in 1857 rolling mills, known as the Victoria Ironworks, and later, the Montreal Rolling Mills, were established at Montreal. After this the imports of sheets, hoops, and nails diminished and the mills turned out the rest of the supply. In 1864 the puddling and rolling mills were capable of supplying the Province with nails and no less than twelve tons of nail plate were turned out daily. Scrap iron was used at first, but as the supply was inadequate, puddling furnaces were added to work up imported pig iron. As much machinery as possible was used to take the place of labor, which was scarce.[1] About the same time Peck, Benny & Company built works in Montreal to manufacture nails, horseshoes, and spikes.

Ontario, too, entered into this phase of industrial development. The Toronto Wire and Ironworks were founded

[1] S. P. Day, *English America*, pp. 179–85.

in 1854.[1] In 1855 an establishment, the only one in Canada, was opened in Kingston to make axles and wheels for railway carriages.[2] The present B. Greening wire plant of Hamilton had its inception in 1859.[3] About 1860 Messrs. Gzowski and Macpherson, of Toronto, started a large rolling mill in that city to re-roll iron rails. Some bar iron was also made out of scrap. In 1873, however, the place was closed and dismantled because of the substitution of steel for iron rails. In 1864 the Great Western Railway Company erected a rolling mill at Hamilton to patch and re-roll iron rails. This continued in operation until 1879, when the plant was leased to the Ontario Rolling Mill Company for the manufacture of bar iron, nail plate, and fish plate made out of scrap iron.

In 1866 the Steel, Iron and Railway Works Company of Toronto was organized to operate a patent process for the manufacture of railway crossing points and for putting steel ends on railroad rails. Operations were confined to the patching of iron rails and the manufacture of some forgings. The introduction of steel rails closed the works for a time, but they were reopened in 1872 after a merger with the Canada Car and Manufacturing Company, which was chartered to manufacture and lease railway cars. The Ontario Government entered into an agreement with the car company to lease the labor of all prisoners at the Central Prison, Toronto, for a term of seven and a half years. The Government was to furnish sufficient workshop space, with foundations for machinery and other permanent structures, and also heat and light. The boilers and engines and shaftings required for motor purposes, the engineers and firemen, and the fuel, were to be provided by the company. The Government was to receive 56 to 60 cents a day for the use of each prisoner. As the prison, in course

[1] *Canadian Mining Manual*, 1895, pp. 251–58.
[2] J. H. L. Morgan, *Tariff History of Canada prior to 1879*, p. 103.
[3] *Canadian Mining Manual*, 1895, pp. 257–58.

of construction, was not suitable, it was altered for the purpose. Several railway sidings and a forge with four large beam-hammers, along with the necessary furnaces and plant for the manufacture of locomotives, car axles, and large forgings were installed. Small hammers, a wheel foundry, equipped to turn out 120 car wheels per day, a large foundry for soft castings, and shops and machinery for making nuts, washers, and bolts, together with a variety of iron- and wood-working tools, were also added. Large stocks of wood, iron, and coal for an extensive business were laid in.

But about this time the depression of the seventies set in, and orders for cars were not to be had at any price. After building 100 to 200 cars the company collapsed and the place was subsequently sold and dismantled.[1]

Nor were the Maritime Provinces backward in the production of finished products. In 1856 the first plant of the Portland Rolling Mills was built in St. John. Bar iron, nail, and spike mills were added in 1860.[2] In 1874 the plant of the present Coldbrook Rolling Mill Company of St. John was begun. In 1873 this company was formed with a capital stock of $1,000,000 and the plant enlarged to manufacture bolts, screws, axes, rails, and railway iron, boiler plate, rivets, tools, implements, and machinery. The rolling mill was built at Coldbrook, three miles from St. John, on the Intercolonial Railway, and a nail factory in connection with it was situated a mile or two away. Old iron rails and scrap iron were the raw materials used. The works were operated for several years and then lay unused until about 1884.[3]

We may now turn to what has since become one of the most important iron and steel plants in Canada. In 1872, at a time when a large demand for railway iron was created

[1] Bartlett, *op. cit.*, pp. 532–34.
[2] *Canadian Mining Manual*, 1895, p. 252.
[3] Bartlett, *op. cit.*, p. 252.

by the building of the Intercolonial Railway, a plant was opened at New Glasgow by Mr. Graham Fraser for the manufacture of marine and railway forgings. Mr. Fraser manufactured railway spikes, springs, and axles out of scrap iron and did a general forge business. After two steel hammers had been installed to handle an increasing trade, the firm was incorporated as the Nova Scotia Forge Company. In 1878, in order to secure water and more room for extensions, the plant was moved to Trenton, where the work was carried on very successfully.[1]

§ 6. Thus, by 1879, the Canadian iron industry had not assumed any great importance. Ontario could boast of no pig-iron producing plant and no very important rolling mills. Quebec was a little better off, with a few fairly large rolling mills and three small blast furnaces. But the Radnor forges, renewed at a later date, were temporarily closed, and the forges and furnaces at St. Maurice and Yamaska were on the eve of abandonment. The plant of the Canada Titanic Iron Company, already closed, was dismantled in 1880. The only important plant in Canada was that at Londonderry, where in the seventies the Steel Company of Canada had built a coke blast furnace and Siemens open-hearth furnaces, as well as extensive finishing mills. Even this attempt to establish the iron industry in Canada was almost a failure, for the company went into the hands of a receiver in 1883. The Nova Scotia Forge Company as yet conducted business only on a small scale, but it had begun its successful career. Other plants manufacturing iron and steel products were numerous, but their operations could not be regarded as comprising an industry of any distinction in the country. In short, the national policy of protection introduced in 1879 had an almost open field in its effort to stimulate a Canadian iron and steel industry.

[1] *Industrial Canada*, vol. VI, pp. 327–29.

CHAPTER IV

ELEMENTS OF SUCCESS AND FAILURE

§ 1. NATURALLY one asks for the reason of this backwardness in the Canadian iron and steel industry. The previous chapter has described in more or less detail the results of all known attempts, down to 1879, to produce iron in Canada; for it is through analysis of the small successes and failures that the fundamental conditions of an industry are revealed.

These conditions of success and failure may be conveniently divided into two general groups. The first group includes the technical and more fundamental conditions, such as the supply and character of ores, fuel, and labor, the presence or absence of technical experience, managerial ability, capital, and the extent and nature of the market. Since each of these conditions is fundamental, they will be discussed at greater length in later sections of this chapter.

Another group of conditions, or factors, might be included under the term "commercial policy." They have to do with the tariff system or any other device for the artificial nourishment of an industry. As the success of the commercial policy depends on those conditions which have been classified as technical, the consideration of the technical conditions of the Canadian iron and steel industry should receive chief attention. It is important, however, to outline the actual tariff policy in force throughout this early period of industrial history, before referring to technical considerations.

§ 2. The history of Canadian commercial policy may be conveniently divided into three periods. The first, ending

in 1846, covers the period of French, and later British, control of the colonies. So long as France and Britain gave the colonial products preferential treatment, they had the privilege of fixing the tariff on goods entering the colonies from foreign nations. In 1842 these "Imperial Duties" were as high as $7\frac{1}{2}$ per cent on pig iron, 15 per cent on castings, nails, etc., and 20 to 30 per cent on wire. Additional customs duties were imposed by the colonies on imports from foreign nations. It is scarcely necessary to say that the British manufacturers supplied the greater part of the Canadian demand. Very little iron was produced in Canada before 1846, and at the same time imports from the United States were negligible.[1]

When England repealed the Corn Laws in 1846, she threw open the home market for grain to foreign as well as colonial producers. The consequence of England's action was a severe depression in the colony in 1847. Canada immediately claimed the right of determining the rates of duty on imported goods, and in 1847 Great Britain saw fit to grant this privilege. The so-called "Imperial Duties" were immediately repealed by the Canadas, and by the Maritime Provinces, and new customs tariff acts were passed.[2] As all iron and steel goods, even those from Great Britain,were included by the Canadas in a 1 per cent list, Glasgow iron founders immediately objected, claiming that their growing iron trade with Canada would be ruined. The British Government, upholding the value of reciprocal exchange of products, claimed that such a policy would be injurious to the trade of both Great Britain and Canada.[3] The colony, however, persisted in her supposedly evil ways until the principle of Canadian autonomy, at least on this point, was firmly lodged in the British public mind. In 1849 Canada advanced the rate on the list of raw materials, including pig iron and iron ore, from 1 to $2\frac{1}{2}$

[1] United States, *Commercial Relations of the United States*, 1842, p. 163.
[2] 10–11 Vic., 1847, chap. 31. [3] Morgan, *op. cit.*, p. 75.

per cent.[1] In 1853 scrap iron, bar iron, pig and sheet iron were kept on this list, notwithstanding the general reduction of duties.[2] By the Reciprocity Treaty of 1854, with the United States, ores of all metals, including iron, were admitted from and exported to the United States free of duty.[3] In 1858 the duties were raised again; on bar iron, wrought and cast steel, plates and hoops, to 5 per cent; on rolling-mill products and iron, n.e.s. (not elsewhere specified), to 20 per cent. Pig iron, scrap iron, coal, and coke were put on the free list.[4] By a new revision in 1859 the 5 per cent list was advanced to 10 per cent, other iron duties remaining the same.[5]

In the Maritime Provinces the duties on iron and steel were considerably advanced in a similar manner, so that when Confederation was proposed in 1867, the duties imposed by the various Provinces were as follows: —

Article	Canada	Nova Scotia	New Brunswick	Prince Edward I'd.
Iron and hardware	20%	12½%	15%	7½%
Iron bars and rods	10	5	15	7½
Iron plates	10	5	15	7½

Thus, on a large volume of goods, Canada was imposing higher duties than were the Maritime Provinces. Pending the settlement of the negotiations for Confederation, the duties were abolished in 1867.

With the organization of Confederation accomplished the new Government set about the preparation of a new tariff. In 1868 iron bars, rods, sheets, plates, nails, spike rod, wrought steel, iron and steel slabs, blooms, billets, and ingots were placed on a 5 per cent list. Pig iron, scrap iron and steel, iron ore, cast steel, rolling-mill products, coal and coke, were admitted free of duty. The "Not elsewhere specified" list was charged 15 per cent.[6] In 1870 blooms and billets were put on the free list, but a duty of 50 cents

[1] *Globe*, 1849, April 18.
[2] Morgan, *op. cit.*, p. 28.
[3] *Ibid.*, p. 3.
[4] 22 Vic., 1858, chap. 76.
[5] *Ibid.*, 1859, chap. 2.
[6] 31 Vic., 1868, chap. 44.

per ton was imposed on coal and coke;[1] this was repealed, however, in 1871.[2] No further revision affecting iron and steel duties seems to have been made prior to 1879.

The duties on iron and steel products were very low; the tariff, as a matter of fact, was a revenue tariff providing only incidental protection. The year 1859 had seen the nearest approach to protection in the form of duties of 10 per cent on a number of products, especially bar iron and cast and wrought iron, and of 20 per cent on rolling-mill products. Pig iron, scrap iron, iron ore, and coal were admitted free practically throughout the period in question. Some have claimed that the beginning of the protective policy may be found in the tariff of 1859, and certainly in Ontario and Quebec a definite opinion existed in favor of such a policy.[3] For instance, a circular was sent out about 1871 asking for an increase of duties on the 5 per cent list to $7\frac{1}{2}$ per cent, and for a duty of 15 per cent on pig iron.[4] The duties, however, were never high after the reduction in 1867, and the tariffs could not be regarded as protective measures.

It is not difficult to determine the relation between such a tariff and an industry which barely maintained an existence throughout this early period. The production of pig iron had to be conducted on its own merits at practically all times. Only one plant, which produced iron of an extraordinarily good quality used for special purposes, was regularly in operation. Otherwise, the continuity of the industry was maintained only by new enterprises taking the place of the previous failures. In spite of the fact that some assistance was given to other lines of production, purposely or not, the greatest developments, even in the finishing industry, came between 1868 and 1879. These were owing largely, as we shall see, to the increased demand

[1] 33 Vic., 1870, chap. 9. [2] *Ibid.*, 1870, chap. 10.
[3] E. Porritt, *Sixty Years of Protection in Canada.*
[4] *Iron Age*, vol. XIII, February 7, p. 7.

for railway supplies, rather than to the duties which had already been reduced by the Act of 1867, and were only partially reimposed by the Act of 1868.

It would be more difficult to estimate what might have happened had the duties been higher. The fact that they were not higher may have handicapped several projects. The production of iron at Annapolis in 1825, at Marmora in the forties, and at Moisic in the seventies, was evidently checked by importations of British iron goods. Yet other conditions, such as the high cost of production and sometimes the low price of iron, were the real factors checking the growth of the iron industry of Canada.

§ 3. To these other factors we may now turn our attention. Probably the one of greatest importance in the development of the industry is the supply of iron ores. As we have seen, a noticeable feature of Canadian ores is their great number and variety. It took a long time to discover them, however; and it is important to note that only a few of the deposits worked at present, those at Londonderry, Nictaux, and Radnor, were known before 1879. Lack of government exploration and of private initiative and perseverance, together with the general lateness of Canadian development, account for the failure to discover ores.

Of the ore deposits that were known, few were satisfactory. The best were not found in sections of the country within a reasonable distance of the markets at that time. Those in eastern Ontario were heavy in sulphur and had to be most carefully worked to produce a good grade of iron. Those used at Houghton contained too much phosphorus to produce the quality of chilled iron demanded at that time. Some ores in Quebec, as at Baie St. Paul, contained too much sulphur, and the titanium, which was of no special value to the iron, necessitated the use of an excessive amount of charcoal in smelting. As the ore at Woodstock was very lean and contained too much phosphorus,

the cost of production of iron was too great, notwithstanding the excellent quality of iron made and the special purpose for which it was used. So, too, the phosphorus in the ore used at Stellarton, Nova Scotia, in 1828, made the iron too hard for foundry purposes. Moreover, while in every country where the manufacture of iron was entered into, a judicious mixture of ores was used to bring about a product suitable for consumption, these local Canadian industries were unable to secure ores of different kinds.

Even where the mines were satisfactory, the cost of mining usually amounted to $1 per ton in the most favorable circumstances. Inexperience of the miners and poor management did not improve conditions. The mines in Ontario, which were usually open cut, could not be worked in winter; those of Nova Scotia were too deep. Nevertheless, the quality of certain ores permitted the production of a specially good quality of iron. The product of the Londonderry plant made excellent cast iron; that produced at St. Maurice and Radnor was not surpassed even by Swedish charcoal iron.

But even the finest of these ores were insufficient to supply a permanent industry, especially since the deposits were usually irregular and small. The most successful of early enterprises, those at Normandale and St. Maurice, had finally to be given up because the beds within reach were exhausted. Even where other factors were the immediate cause of abandonment of iron-making establishments, the scarcity of ore must shortly have placed a check on operations.

Allied to this question of exhaustion of ore deposits is that of the proximity of the ore to the plant. The lower the grade of ore, the greater the cost of transportation of the ore per ton of pig iron produced. Likewise the distance from the plant of a comparatively rich ore might easily place it outside the range of commercial value. In cases, as at Lyndhurst, the plant was built too far from the

deposits in the first place. More often, as the deposits were exhausted, the ore had to be brought from greater and greater distances until finally its use became quite impracticable, and operations had to be abandoned.

§ 4. Fluxing materials are exceptionally abundant in Canada; so absence of these did not hinder the early establishment of an iron and steel industry. The supply of fuel was less satisfactory. As a matter of fact, therein lies the greatest difficulty with which the industry, especially in certain localities, has had to contend. Before the introduction of the use of bituminous coal, the lack of beds of anthracite coal in eastern Canada limited the iron industry to the manufacture of charcoal iron. Yet while Canada is well supplied with excellent hardwoods for making charcoal, these were not always found within reasonable distance of the furnaces. In certain sections the charcoal could be obtained cheaply from the settlers, who made it during the otherwise idle winter months, but in other cases it was necessary to secure a government grant of woodland to insure a steady supply. Before the end of the period in question the demand for charcoal iron was restricted to certain uses and did not apply to general consumption. At such a period the use of charcoal was often an absolute detriment to the industry. The use of bituminous coke-producing coal gradually altered the situation in Nova Scotia, but only near the end of the period in question.

Ontario is, unfortunately, absolutely devoid of coal, and her distance from coal-fields has always placed her at a disadvantage for the production of coke iron. In the early period the transportation of coal or coke to the ores was usually quite impracticable unless the duty was removed, and unless the plant was large enough to demand a considerable supply. The freight rates on coal carried from Nova Scotia to Ontario were very high, especially in winter

when the St. Lawrence River was closed to navigation. Consequently it was almost impossible for Ontario to compete with Nova Scotia in the production of iron, and especially with the United States and England, where the ores were in close proximity to a permanent source of good fuel.

§ 5. The lack of transport service was another difficulty. Mention of transportation has been made, already, in the discussion of carrying ore to the furnaces, which, of course, usually means the carrying of ore to the coal deposits. In this early period, the blast furnace was commonly built near the ore deposits, the fuel was secured from neighboring forests or coal mines, or brought from a distance, and the products shipped some distance to market. In the latter contingency, railways or canals or other facilities for transportation were of very great importance. In early years the lack of carrying agencies gave rise to difficulty at Marmora and Radnor. In certain cases they were adequate. The plant at Normandale was close enough to Lake Erie to permit the owner to ship his wares to Canadian Lake ports, to Buffalo, and even to Chicago. The Intercolonial Railway gave the plant at Londonderry a new market and a new outlet, and, at the same time, a more direct and a cheaper supply of coal from the Springhill and Pictou collieries.

In some respects the iron industry was adversely affected by the increase of transportation facilities. The development of the canal system of the St. Lawrence did not improve the situation, for British iron was let in at such prices that it was impossible for the Canadian producer to compete in the Ontario market. Later, when iron rails were rapidly supplanted by heavier steel rails, plants that used iron rails as raw material had either to close down or to use pig iron or other scrap iron. Thus, the influence of transportation facilities in permitting the product to reach a

market, in supplying raw material, and even the protection which the lack of transportation facilities gave to the local home markets when other factors were favorable, can hardly be overestimated in respect to this early period.

§ 6. The labor supply seems to have given occasion for additional difficulty. It is said that at Normandale the men were arrogant and unruly, went on a strike on the least provocation, and, as labor was scarce, easily had their own way. At St. Maurice, wages were relatively low because much of the work could be done during the winter by the *habitants*, but in most cases day wages were 50 cents higher than in other countries.[1] At Londonderry ordinary laborers received $1 to $1.30, miners $1.50, and furnace-men $1.50 to $1.80 per day. The lack of skilled and experienced labor and the absence of managerial ability, which is of first importance in the iron and steel manufacture, were primary factors in retarding its growth. As the industry was new to the country, the workmen had to be brought from abroad until Canadians could be trained. To induce men to leave remunerative employment in old established smelting centers, it was necessary to offer them wages higher than their previous maximum.[2] This was the case at the first furnace built in Nova Scotia in 1825. In Quebec, at St. Maurice, the French soldiers had to be called into service, and workmen had to be brought from France. So, too, in Ontario, at Lyndhurst and Marmora, inexperience and inefficiency left the plants far behind the times. Owing to a lack of metallurgical knowledge, the Moisic Iron Company, with ores assaying 70 per cent, used a process far too expensive. Later, at Quebec, the Siemens open-hearth furnaces were operated by a man who knew nothing of the theory or practice of steel-making.

[1] Harrington, *op. cit.*, pp. 242–43.

[2] Watson Griffin, "Canadian Iron and Steel," *Canadian Mining Journal*, vol. XXI, p. 208.

Even where labor was secured, men gathered together from a number of places in foreign countries had to learn how to work together and to make use of materials to which they were not accustomed. Thus even experienced men made many mistakes. Is it not a wonder, then, that, with lack of skilled and cheap labor, with poor and inexperienced management, with strikes, lack of energy, cases of high and unnecessary expenses, fraud, graft, and accident, the early industry was not a complete failure?

§ 7. A like difficulty was the lack of capital so important in this industry which requires large investments. In some cases trouble arose from inability to raise sufficient capital to conduct the works on a broad and expansive scale. Such failures as those at Marmora in 1856 discouraged English capital, and that at Madoc in 1846 was a check on the investment of American capital. The other failures were quite sufficient to discourage domestic endeavors, especially when other industries, more adapted to the country and to the stage of industrial development, assured more profit. Ill-considered and excessive expenditure of capital at an unfavorable point wrecked certain enterprises at Marmora and Moisic. At other times failure arose from the impossibility of securing working capital at a critical moment.

§ 8. Reference has been made already to the fact that the lack of transportation facilities kept up the local market price and thus protected the producer, and that on other occasions the improvement of transportation precipitated a fall of prices in Canada. Financial and business depressions were particularly apt to leave a swath of failures. When prices in England after 1846 fell rapidly to almost half the price obtainable in the early forties, the furnace at Normandale had to be given up and the Marmora furnace was temporarily closed. In the fifties, prices

were fairly high; pig iron rose from $24 per ton in 1852 to $37 in 1857. After a short depression, prices rose rapidly in the middle sixties. They were high again from 1872 to 1874, pig iron selling at $50 per ton, and a number of iron furnaces and rolling mills were put in operation. General financial depression in the seventies, combined with the use of bituminous coal in the United States, brought the prices of iron goods tumbling down. At Philadelphia pig iron sold for $18 a ton in 1877 and 1878. Consequently, the Moisic Iron Company, the Steel Company of Canada, the Canada Car and Manufacturing Company, as well as other firms, went out of business or became insolvent.[1]

§ 9. Each of the foregoing factors has operated at some or all points in the development of the Canadian iron industry, and brought hopeful beginnings to fruitless disaster. But to appreciate properly the development of a particular industry, we must give due consideration to the nature of the market. Like most Canadian manufacturers, the early maker of iron found himself cut off from Great Britain by a long haul, and at all events by a long sea voyage. The iron from Woodstock was shipped to England only because it was unique in quality and could be used for making armor plate. The United States market for pig and finished iron was usually barred by a high protective tariff.[2] In the six years from 1821 to 1826, the British American colonies shipped to the United States iron and steel worth only $54,707, an average of about $9000 per year.[3] In the two years, 1850 to 1851, Canada exported iron and steel worth only $39,000; [4] practically all of it to the United States. By 1861 Canada was exporting $466,420 of iron and steel, and in the prosperous year 1873 an equivalent of

[1] See Appendix H.

[2] In 1824, $18 per long ton; $10 in 1852; $7 per short ton in 1870.

[3] United States, *Report of the Secretary of the Treasury on Commerce of British North America*, 1851, pp. 326–41.

[4] Andrews, *Report on Colonial and Lake Trade*, 1852, p. 467.

$1,492,000. Thereafter exports fell off to an average of about $600,000 per year for the last half of the decade. About one quarter of the exports in 1868 consisted of scrap iron and about two thirds of pig iron.[1] In 1871 the exports of iron and steel amounted to $766,111 as compared with a home production of $10,177,911. Obviously, then, Canadian producers had to depend largely on the home market.[2]

For a long time the home market was none too encouraging a prospect. When iron was first smelted in the United States in 1645, Canada had a population of less than 3,000 and in 1763, twenty-six years after the first furnace had begun operations in Canada, there were only about 60,000 people in the country. With a population of that size using a few iron kettles and stoves, and a few cannons and mortars for defensive purposes, and with the people scattered over a country where transportation was mainly by water and wagons, the opportunity for an extensive iron industry was small, indeed. On the other hand, a large and growing population in the British colonies to the south, demanding iron so insistently and in such quantities that the restrictions of the Home Government failed to prevent the establishment of a large number of concerns turning out finished products, gave the New England ironmaker a market beyond all comparison with that of his Canadian contemporaries. When George Washington became President, iron was being made in almost every State in the United States; there was but one small furnace in Canada.[3] At the beginning of the nineteenth century the population of what is now Canada was considerably below the half-million mark; some twenty-five years later it had increased to 900,000; and in 1851 it was over 2,300,000; in 1871 it was over 3,500,000, and in 1881 over 4,300,000.[4] These statis-

[1] United States, *Commercial Relations of the United States*, 1868.
[2] See Appendix C, Table I, and Appendix G, Table I.
[3] E. Channing, *The United States of America*, vol. I, p. 1.
[4] See Appendix A.

tics indicate in a general way the size of the market at various times for such manufactures as stoves, kettles, pots, and other iron goods in general use. Contrast with this the situation in the United States. In 1790 there were nearly 4,000,000 in the country, nearly eight times as many as in Canada. In 1850 there were 25,000,000 people, ten times as many as in Canada, and in 1881 there were 38,000,000, or nine times the population of Canada. A better understanding of the size of the market may be obtained by considering the number of plants producing various finishing products. Until 1850 the general extent of Canadian manufacturing was not great. More than twice as many people were employed in agricultural as in industrial occupations.[1] Sawmills and gristmills constituted the chief industrial enterprises of the country, and until these began to use steam instead of water power, and until other kinds of industries began to spring up, the demand for iron goods for industrial purposes was small.

Even before 1851, however, the production of the more highly finished iron products had begun in Canada. Most countries have produced finished iron products even earlier than such intermediate products as pig iron and bar iron, and, as we have already seen, many of the earlier forges in Canada were producing the actual finished articles. Besides these, plants were established to produce finished articles from scrap iron, pig iron, or bar iron. The production of pig iron, of course, presumed that such a market existed.

Satisfactory statistics regarding various kinds of products are not available. No general figures are at hand unless the items, "machine shop and foundry products" and "iron and steel products" may be regarded as satisfactorily inclusive. While these items by no means represent all the endeavors to manufacture iron and steel products, they may be accepted as of some significance in indicating, in a

[1] *Census of Canada*, 1871, vol. IV, p. 193.

general way, the extent of the Canadian output of finished products and the demand for raw materials.

In 1871 the two items, "machine shop and foundry products" and "iron and steel products," in the Census, amounted to over $10,000,000. By 1881 the total output of iron and steel products amounted to $16,000,000. An important single factor in expanding the demand for iron was the growth of railway mileage from 159 miles in 1851 to 7331 miles in 1881. The Nova Scotia Steel and Forge Company was largely the product of the opportunity to supply railway iron in the early seventies for the Intercolonial Railway.

On the other hand, a surprisingly large part of the demand for iron, finished and unwrought, was met by importation. In 1844 iron to the value of over $1,500,000 was imported, largely from the United Kingdom.[1] In 1850 this item amounted to $1,500,000; in 1854, to about $6,000,000; in 1858, to about $2,500,000; and in 1862, $1,500,000 worth was imported. In the sixties the annual imports averaged about $5,000,000.[2] In the early seventies the building of the Intercolonial Railway brought the annual average up to $20,000,000. But depression followed in the second half of the decade, and imports of iron and steel fell to an average of about $10,000,000 per year. Thus in 1881 about one half of the consumption of iron and steel products was manufactured within the country. A modern mill could have produced the total imports of all kinds, but it would scarcely have represented an extensive iron and steel industry.

§ 10. It has been quite evident that the tariff duties that existed prior to 1879 did not establish in Canada a great iron and steel industry. It also appears that conditions existed which would themselves have prevented the exten-

[1] United States, *Report of the Secretary of the Treasury, op. cit.*, p. 148.
[2] See Appendix A.

sion of the industry except under the stimulus of an extraordinarily high scale of duties. The narrowness of the market prevented the development of plants that could compete with the English firms producing on a large scale. If the Canadian producers could scarcely meet British and American prices, even with the advantage of proximity to the market, they could hardly be expected to meet the same producers in foreign markets. The most, therefore, that a rather high customs tariff could possibly have done would have been to develop a small Canadian iron and steel trade to supply the limited home market.

Would high protection have been a wise policy under such circumstances? The answer to this question involves a fundamental principle that is as true to-day as it was fifty or thirty years ago. Although conditions of to-day may warrant high protection, the principle should be kept in mind.

New countries always make large *per capita* investments in the form of imported goods. Iron and steel products, used in so many industries both extractive and manufacturing, form a large part of this investment. Almost every new enterprise demands a high consumption of iron in its original investment and in its operation. Furthermore, it is desirable that such capital goods should be obtainable at as low a cost as possible, that they may not form a future burden on the industry of a country until replaced by less costly materials at a later date. The wisdom of a low-tariff policy under such conditions may then pass unchallenged, especially when unfavorable conditions, as we have already noted, would have set the cost of an adequate home production exceedingly high. The natural costs of transportation were protection enough, and the incidental protection granted by the revenue tariff was a gratuity that would probably have been avoided but for financial reasons. That the iron interests were not large enough or strong enough to influence the political situation is additional

evidence that a high protective system would have been ill-advised during this early period of Canada's industrial development. Whether elements were introduced to render this general conclusion invalid for more recent years is the main problem of the remainder of our study.

PART THREE

THE CANADIAN IRON AND STEEL INDUSTRY 1879–1897

CHAPTER V

THE TARIFF AND BOUNTY SYSTEM

§ 1. In most respects the year 1867 marks the beginning of the third period of Canadian economic history. The seventies, as well as the early eighties, and the period from 1893 to 1897 were years of general industrial depression: an era of trial. Hope and energy were often defeated by difficulty and discouragement. The adoption of the national policy of protection in 1879, however, gives some reason for distinguishing the years 1879 to 1897 from the earlier part of the period. For our purpose, at least, in tracing the history of the Canadian iron and steel industry in its relation to the tariff, we shall follow such a division.

The protective spirit had appeared in Canada before 1879. In the fifties, Isaac Buchanan had organized a movement in favor of high protection. The tariff acts of the early sixties admittedly granted some incidental protection, and, in 1871, a high protective tariff had been framed and put into force, only to be withdrawn in 1872. But the depression of the seventies resulted in a deficit for the Dominion Treasury, at a time when governmental expenditures for railroads were very great. Consequently, the Conservatives, who had attempted to introduce protection in 1871, seized on the opportunity to regain power by advocating a national policy of protection in 1878. The scheme was a success beyond expectations. A combination of patriotic feeling, half-tacit belief in the protective policy, and the natural tendency to attribute depression to the Government in power, resulted in an election which relieved the Liberal Party of the duties of administration. By 1880 the protective policy was an accepted principle in

the minds of the greater number of Canadian people.[1] The application of this principle to the iron and steel industry is the subject to be discussed in this chapter.

§ 2. Evidence has already been presented to establish the fact that there was ample room for the development of an iron industry. In 1879 there was only one iron plant of importance in the Dominion, and the rolling-mill industry was far from supplying the needs of the country. The opportunity to develop an industry was accepted by the Conservatives in 1879 when they introduced the national policy of protection and increased the duties on iron. Altogether, thirty-one items were mentioned in the iron schedule.[2] Pig iron was admitted at $2 per ton; scrap iron, at 12½ per cent *ad valorem*,[3] slabs, blooms and billets, muck and puddled bars, at 12½ per cent; and rolled and hammered bars, at 17½ per cent. The duties on other articles varied from 10 to 35 per cent as follows: Locomotive steel tires, 10 per cent; hoops, 12½ per cent; iron and steel wire, 15 per cent; railway fishplates and frogs, 17 per cent; stoves, castings, and car wheels, 25 per cent; bolts, nuts, and nails, 30 per cent; screws, 35 per cent.

Mr. McLean, in his "Tariff History of Canada," estimates the average rate of duty from 1879 to 1887 at 20.78 per cent.[4] If the duty of $2 per ton on pig iron were intended to be protective, allowance should be made for other provisions. For instance, as a favor to New Brunswick shipbuilders, a full drawback of duties paid was given on iron imported and used in composite ships.[5] The duties on bituminous and anthracite coal and on coke were in-

[1] It has been said the Liberals would have adopted the protective policy had the Conservatives not done so. The Liberal Party has been accused of stealing the protective policy in 1897.

[2] 42 Vic., 1879, chap. 15; see Appendix F.

[3] Equal to about $2 per ton.

[4] J. A. McLean, *The Tariff History of Canada*, p. 32.

[5] *House of Commons Debates*, 1879, p. 1449.

creased to 50 cents per ton as a favor to Nova Scotia mines. The duty of $2 per ton on pig iron was little more than compensation for the increased duty on fuel. The greatest increase in protection was given to the industries producing the more finished products. The producers of raw materials secured protection amounting to about 10 or 20 per cent.

From 1879 to 1887 there was no general tariff revision. Now and then some change in an item was made, to meet fiscal needs or to suit protective policy or political necessity. In 1880 the duties on slabs, blooms, and billets were reduced from 12½ to 10 per cent. It was provided that steel ingots should be admitted free for another year, or until they were manufactured in Canada, at which time a duty of $5 per ton was to be imposed.[1] In 1881 the rate on rolled beams, channels, and angles was reduced from 15 to 12½ per cent, and the rate on wrought-iron tubing was increased from 15 to 25 per cent.[2] In 1882 iron and steel, old scrap, galvanized iron and steel wire 15 gauge and under, steel rails, bars, and fishplates were added to the free list.[3] Drawbacks were given on articles used in the construction of the Canadian Pacific Railway.[4] As a substitute for the duty, to offset the reductions on scrap iron, and to avoid a readjustment of the whole schedule, the Government decided, in 1883, to inaugurate a bounty system. The bounty on pig iron was fixed for two periods of three years each at $1.50 per ton for the first period, and $1.00 for the second.[5] Provision was made for regulating quantity and for such other details as might be found expedient, to prevent fraud and insure the good effect of the act.[6]

In 1884,[7] in order to give more protection to the steel

[1] 43 Vic., 1880, chap. 18.
[2] *Budget Speech*, 1881, February 18, pp. 48–49.
[3] 45 Vic., 1882, chap. 6.
[4] 45 Vic., 1882, chap. 7.
[5] 43 Vic., 1880, chap. 14.
[6] *Journal of the Iron and Steel Institute*, 1883, no. XII, p. 796.
[7] 47 Vic., 1884, chap. 30.

industry, the duty on steel was changed from $5 to $3 per ton, plus 5 per cent. The rate on steel rolled wire rods for manufacturing wire was reduced from 15 to 5 per cent; steel and iron angles, beams, plates, and knees for ships were placed on the free list. In 1885 there were additions to the free list as follows:[1] Coke used in Canadian manufacturing, steel for use in the manufacture of skates, hoop iron for the manufacture of tubular rivets, and steel in sheets for manufacture of spades and shovels. In 1886[2] there was an increase of duties on several finished products. Bolts, nuts, and rivets were charged 1 cent per pound plus 15 per cent. The duty on wrought-iron tubing was increased from 25 to 35 per cent. Galvanized iron and steel were taken from the free list and taxed 20 per cent. Scrap iron and steel, when not fit for actual use, were admitted free. At the same time the payment of a bounty of $1.50 per ton on pig iron was extended till 1890, and a bounty of $1.00 per ton thereafter was provided for till 1892.[3]

§ 3. The crisis in the movement to give higher protection to the iron industry came in 1887. It is said that Nova Scotia began to talk of secession unless her industries were as favorably treated as were those of other Provinces. Consequently much higher protective duties were introduced in favor of the iron and steel industry. Three general principles were followed. In the first place, the American tariff, which was supposed to be a carefully worked-out schedule, was taken as the basis of the Canadian duties, two thirds of the American duties in general being imposed. Pig iron was granted the protection of a duty of $4 per ton; scrap iron was taxed $2 per ton; bar and rolled iron were made dutiable at $13 and railway fishplates at $12 per ton. Another principle was that of not pressing too heavily on the railroad industry. The third was the substitution of specific

[1] *Budget Speech*, 1885, March 3, p. 59.
[2] 49 Vic., 1886, chap. 18.
[3] 49 Vic., 1886, chap. 38.

and compound for *ad valorem* duties. Shapes for bridge-building were made dutiable at one half cent per pound plus 10 per cent; nuts, washers, and bolts at one cent per pound plus 25 per cent. A 35 per cent minimum *ad valorem* duty was frequently added; as in the case of iron and steel forgings, which were charged $1\frac{1}{2}$ cents per pound, with a minimum of 35 per cent. The duty on steel ingots was increased from $3 plus 10 per cent to 30 per cent, with a $12 minimum. Wire for steel spring, formerly on the free list, was charged 20 per cent because it was now being made in Canada. Iron and steel wire for fencing of a kind not made in the country was placed on the free list.[1]

Thus there was a general increase in protection, few imports escaping increased duties. The primary industry received an increase of protection amounting to $2 per ton, and producers of finished products were favored by much more than a compensatory duty. While the duty on bituminous coal was maintained in favor of Nova Scotia, anthracite was placed on the free list in the hope of developing and extending the Ontario iron industry.[2] As railway development was of enormous importance to the country, steel rails were left on the free list.[3] Since railway fishplates were being manufactured in the country from imported material on which increased duties were paid,[4] the producers were given the protection of a duty of $12 per ton.

The year 1890 saw an alteration here and there; the duty on picks and mattocks was raised from 35 per cent to 1 cent per pound plus 25 per cent. The *ad valorem* duty on spades and shovels was increased by 5 per cent. Duties on wrought iron and steel nuts, washers, rivets, bolts, and hinges were increased by 3 per cent. Wrought scrap iron and scrap steel were charged $2 per ton. Ferro-manganese, silicon, spiegeleisen, steel bloom ends, and crop ends of

[1] *Debates*, 1887, p. 501.
[2] *Ibid.*, p. 402.
[3] *Ibid.*, p. 1043.
[4] *Debates*, 1888, p. 502.

steel rails imported for the manufacture of iron and steel, were charged $2. At the same time the bounty on pig iron was increased from $1 to $2 per ton, and extended to cover the years from 1892 to 1897.

§ 4. In 1893 there was a wide demand for reduction of the Canadian customs duties, especially the duties in the iron schedule, and a general revision resulted. The duty on bar iron was reduced from $13 to $10; on puddled bars, from $9 to $5; on iron and steel screws, from 35 to 30 per cent; on implements, from 35 per cent to 20 per cent; on barbed wire, from 1½ cents to three fourths cent per pound. Pig iron, however, remained dutiable at $4 per ton, and the duty on wrought scrap iron was increased to $3 for 1895, and $4 thereafter. Producers of spiegeleisen suffered a reduction of protection from 10 to 5 per cent. Slabs, blooms, and billets were charged $5 per ton. In order to include material brought from Great Britain as ballast, cuttings, clippings, and punchings were charged $4 per ton. Public opinion demanded a reduction, especially on the finished products, like agricultural implements. The revision tended, therefore, to cheapen the finished products by reducing the duties, but the rates on raw materials, pig iron and scrap iron, were maintained or raised.

The bounty of $3 per ton on pig iron was continued for five years for furnaces then in operation, and was to be paid for five years after the beginning of operations to furnaces built thereafter. Thus, while the rate of bounty was not increased, its operation was extended and made more effective. Furthermore, as compensation for the reduction in the customs duties, the law provided for a bounty of $2 per ton on puddled bars and steel billets made in Canada from Canadian pig made from Canadian ore. The manufacturers had to submit satisfactory evidence that the claims were correct.[1] Later, in 1896,[2] the pig-iron

[1] 57–58 Vic., 1893, chap. 9. [2] 60–61 Vic., 1896, chap. 6.

bounty system was extended by making it applicable to all iron made in Canada, in proportion to the percentage of domestic ore used. The manufacturers claimed that Canadian ore was too uniform in quality to permit the production of all the grades of iron required. Moreover, the furnace which the Nova Scotia Steel Company had built at Ferrona, Nova Scotia, was using Newfoundland ore, and the Hamilton Blast Furnace Company was importing considerable quantities of ore from the Lake Superior district.[1] Although the law affected only the proportion made from Canadian ore, it paved the way for larger claims, and a further extension by the Liberals, in 1897.

§ 5. Meanwhile, the Provinces and municipalities were also giving aid to the iron and steel industry. As a result of a deputation to Sir Oliver Mowat, Prime Minister of Ontario, urging that a provincial bonus of $2 per ton be granted on pig iron made from Ontario ore, Ontario instituted a bounty system. A mining fund of $125,000, out of which a bounty of $1 for each short ton of pig metal might be paid for five years after July 1, 1894, was set aside for producers of iron ore. Not more than $25,000 was to be paid each year, and, if the ore mined and smelted exceeded the equivalent of 25,000 tons of pig iron, the bounty per ton was to be proportionately reduced.[2] In spite of the fact that the bounty was payable to the miners of iron ore, the furnace-men were able to secure nearly all the benefit, since the competition of the miners usually reduced the price of the ore by the extent of the bounty.[3]

In 1895 Quebec passed "An Act Respecting the Colonization of Certain Parts of the Province and for promoting the Mining Industry Therein." The Canada Iron Furnace

[1] *Iron Age*, vol. LVIII, p. 58.
[2] Ontario, *Report of Bureau of Mines*, 1908, p. 196.
[3] *Monetary Times*, vol. LXXX, p. 610.

Company was virtually made a colonization society, and 30,000 acres of woodland were set aside or reserved for purposes of colonization by the employees of the company. The industry was thus protected from woodland speculators and was assured of a constant supply of fuel.[1]

Municipalities also offered special inducements to this industry in the form of exemptions from taxation, bonuses, and free sites; and railroads offered attractive freight rates. Pictou, Nova Scotia, gave the Pictou Charcoal Iron Company a subsidy of $20,000 and a twenty-year exemption from taxation. Hamilton was even more generous in granting the Hamilton Blast Furnace Company a site of seventy-five acres of land at a cost of $35,000, a bonus of $40,000 in city debentures, and a bonus of $60,000, if steel-works were built.[2]

§ 6. Such is a general outline of the government aid given to the iron and steel industry under the first period of the application of the national or protective policy. It remains now to consider the merits of the policy adopted as well as those features which tended to make it useless or even opposed to the interests of Canadian industrial development.

When the national policy was first introduced, and when it was extended from time to time, the usual arguments were urged in its favor. The Government expected a great development of the iron and steel industry. For instance, Sir Leonard Tilley in 1879 prophesied the introduction of a new process by which the phosphorus and sulphur in iron ore could be removed by the application of heat from petroleum. He expected that the iron industry would spring up all over the country and with most beneficial results.[3]

[1] *Canadian Engineer*, vol. III, p. 290.
[2] *Canadian Mining Review*, vol. III, p. 21.
[3] *Budget Speech*, 1879, p. 13.

Sir Charles Tupper was even more hopeful, in 1887, when he said that iron plants in the Northwest Territories and in British Columbia would swell the Canadian output.[1]

Probably the most important and legitimate justification of this policy in this early period lay in the hope of developing Canada's enormous natural resources; a stock argument accepted by miners, manufacturers, laborers, farmers, and the consuming public alike. The Government, in "taking into consideration the enormous iron interests of the country," was considering the large deposits of ore adjacent to inexhaustible coal-beds in Nova Scotia. In every Province of Canada, as we have seen, there were large deposits of iron ore. Quite as important as the benefit to the miners of iron ore was the stimulus expected for the coal industry. Statistics were quoted to show that increased production of iron always brings a large increase in the coal output. The coal industry would be taxed to its full capacity to furnish the additional output required. Consequently, in 1887, when the Government hoped to encourage the iron industry of Ontario and to check the exportation of Ontario's ores to the United States,[2] it felt free to abolish the duty on anthracite coal.

The Government hoped, too, that protection to the iron and steel industry would entirely sweep away Canada's so-called "unfavorable balance of trade." In 1887 Mr. Tupper quoted statistics to show that Canada's excess of imports was practically equal to her imports of iron and steel products.[3] Why should not the Canadian industry supply the whole demand and sweep away the unfavorable balance? This argument was particularly appropriate in view of the fact that American ironmakers were selling in Canada at slaughter prices. In 1879 circulars had stated that Americans would sell iron at a price 10 per cent below the

[1] *Budget Speech*, 1887, March 30, pp. 49–51.
[2] *Ibid.*, pp. 45–51.
[3] *Ibid.*, pp. 49–51.

price at the furnace at Londonderry, Nova Scotia.[1] In 1889 the nail trade of the United States was reported to be in such a flourishing state that a reduction of Canadian protection would have ruined the Canadian mills. We find, however, that in 1893 to 1895 Canadian plants were able to continue production, despite the fall in prices and unwonted stress of competition with iron-men of the United States. Unquestionably Canadian mills benefited to the extent of learning a few secrets of economy to stand them in good stead thereafter, yet the dumping of American products naturally gave rise to a demand for an increase of protection.[2]

Protection was to be a boon to another general interest — the laboring class. As we have seen, the tariff of 1887, based on the American iron and steel schedule, gave protection in proportion to the amount of labor involved in production, least on raw materials, more on intermediate products, and most on finished articles.

The development of the iron and steel industry would undoubtedly mean employment for more labor in mining, transportation, machinery, coal mining, quarrying, and building industries.[3] The development of a charcoal iron industry would increase the demand for charcoal, and thus would prove of value to the agricultural communities from which the charcoal might be secured. Furthermore, as the producer of pig iron could not fall back on other producers to recoup himself for losses sustained in times of depression, he could only cut down wages of the men employed. As the manufacture of pig iron involved the employment of much labor, such a course was not desirable; consequently protection should be granted the industry in proportion to the amount of labor used.[4]

[1] *Iron Age*, vol. LVI, p. 992.
[2] *Bulletin of the Iron and Steel Association*, 1886, vol. XX, p. 1.
[3] Ontario, *Report of Royal Commission on Mines*, p. 216.
[4] *Canadian Mining Review*, vol. XV, p. 172.

As if the protective principle were none too sound fundamentally, a few other arguments were tacked on. The tariff of 1887 was said to be partly a revenue measure.[1] In 1893 it was agreed that protection was necessary to offset the freight on Nova Scotia's shipments of iron to Ontario. As Nova Scotia ordinarily paid $4.50 a ton for shipping iron to Ontario, by either rail or water, iron shipped from Buffalo to Ontario was scarcely at a disadvantage after paying the duty. Inland freight on British iron was also much less than on domestic iron, so that the duty was at least half neutralized by greater costs of transportation.[2]

The Government pointed out, too, that to start an iron industry on an important scale in any country, however favorable the natural conditions, state aid by bounty or tariff protection, or both, had been found necessary, and that those countries which had protected the industry were then the large producers of iron.[3] The iron industry of Great Britain was supposed to have been developed by high protective duties; the influence of technical inventions and free raw materials was entirely overlooked.[4] The American iron industry was taken as a further illustration of the benefits of protection; it was convenient to omit the fact that the early iron trade of the United States was developed along the eastern seaboard under extraordinary conditions, and that a high tariff did not save it so far as those localities were concerned.[5] The need for some encouragement was fully explained on the ground that all iron industries are handicapped at first by very heavy initial expenditure in prospecting, construction of plant, securing and developing mines, woodlands, quarries, and shipping docks. The Government, therefore, thought it imperative that it should give stability to the tariff and so invite the confidence of capitalists.[6] While, theoretically,

[1] *Debates*, 1887, p. 1208.
[2] *Iron Age*, vol. LI, p. 1291.
[3] *Canadian Engineer*, vol. I, p. 246.
[4] *Debates*, 1903, p. 4264.
[5] *Ibid.*, p. 4289.
[6] *Canadian Engineer*, vol. III, p. 289.

such was the policy, in practice the reverse obtained. For instance, in 1894, Mr. Foster gave an increase of protection to iron and steel wire manufacturers who had finished all experimenting and had begun to manufacture extensively.[1] In other words, the practice seemed to be to grant protection, not to infant industries, but to industries that had already assumed considerable importance.

§ 7. Meanwhile the duties, especially those of 1887, were under much discussion. This discussion ended during the years 1893 to 1896, in a general demand for reduction.[2] Of course, some asked for much higher protection for the primary products and prohibitive duties on substitutes. On the other hand, manufacturers for whom these goods were raw materials were anxious to secure them as cheaply as possible. Consumers, too, were anxious to secure the finished products at low prices, but the manufacturers of such products wanted adequate protection.

It is natural, then, that the first discussion centered around the effect of the duties of 1879. Since there was only one producing plant in the country at this time, — that at Londonderry, — it was claimed that the duty was protecting a monopoly and that the Londonderry company kept the price 15 to 30 cents per hundredweight, or $2 per ton, higher than Liverpool prices. It took advantage not only of the duty, but even of the insurance against rust during transportation of iron from Europe. Prices for pig iron advanced as English prices advanced.[3] Although the

[1] *Debates*, 1894, p. 2513. [2] *Canadian Engineer*, vol. I, p. 246.

[3] *Prices of pig iron 1878–81 (per 100 lbs.)*

	1878	1879	1880	1881
English iron at Montreal, duty not paid.....		1.63	1.89	1.70
Londonderry iron.....		1.80	2.15	2.00
Londonderry iron at St. John, N.B.....	1.90	2.10	2.45	2.20

Prices of nail sheet at Montreal 1878–81 (per 100 lbs.)

English iron, duty not paid.....	1.70	1.70	2.05	1.70
Londonderry iron.....	1.80	1.80	2.15	1.85

— *Debates*, 1882, pp. 1217–19.

increase of the price of pig iron may have been partly due to the high quality of Londonderry iron, some share of it certainly was due to the increase of customs duty, especially as the margin of profit changed with the increase of protection from 17 cents per hundred pounds in 1879 to 30 cents in 1881. When bar iron at Philadelphia was sold for a little over $1 per hundredweight in 1885, it was quoted at Montreal at $2.05 to $2.15. Evidently the Canadian price was the Philadelphia price plus transportation charges and most of the duty. The price of pig iron at Montreal, as compared with the price at Ferrona, was almost regularly higher by the amount of the transportation charges. Thus, the price of iron in Canada seems to have been the foreign price, plus costs of transportation, and a considerable part of the tariff. Similar results seem to have followed the revisions of 1887 and 1894. In 1887 the bar-iron price list was advanced 25 to 33 per cent. The Massey-Harris Company declared that bar iron and steel had advanced $10 to $15 per ton, pig iron, $2 to $5 per ton, and everything else in proportion to the duties.

A comparison of prices of Canadian iron at Ferrona, American and Scotch iron at Chicago, and No. 1 Summerlee iron at Montreal shows that the high level was maintained in Canada.[1] Previous to 1894 the price of iron at the furnaces at Ferrona averaged $2 to $4 per ton more than the price at Chicago. After 1894 when

[1] *Average Monthly Prices of Pig Iron, 1888–96.*

	Canadian iron at Ferrona	American iron at Chicago	Scotch iron at Chicago	No. 1 Summerlee iron at Montreal
1888	$16–18	$17.20	$ 9.71	$20.50–24.50
1889	17–18	15.80	11.60	21.00–25.00
1890	18–19	16.75	12.00	21.00–21.50
1891	16–17	15.00	11.45	18.25–19.00
1892	15–16	14.00	10.18	18.00–19.00
1893	13–14	13.00	10.28	19.00–20.00
1894	12–13	10.50	10.38	18.50–20.00
1895	11–15	9.50	10.80	18.50–20.00
1896	14–15	10.50	11.56	17.00–18.50

— *Canadian Mining Manual*, 1897, pt. II, pp. 75–76.

the scrap iron duty was increased the margin of difference increased. The difference in price between Summerlee iron at Montreal, that is when delivered at the chief Canadian market, and American iron at Chicago was even greater. Clearly the protective policy caused an increase in the prices of iron and steel and with a few exceptions prices were maintained at a higher level than in other countries practically throughout the period. The "Canadian Mining Review" estimated that over two-thirds of the duty was used to protect home industry.[1]

If we turn now to the finished products, a somewhat different situation is found. A very rapid addition to the number of producing plants resulted in such an increase of production that, in 1891, the least weakness of the market led to excessive price-cutting. The organization of bar iron, nail, bolt and nut, and shovel associations, which kept up prices more or less successfully, naturally followed. Consequently the tariff was at least partially responsible for combinations and high prices. The protective iron schedule of the tariffs of 1879 and 1887 can be said to have afforded considerable protection to the iron and steel industry, in short, a protection that found expression in higher prices. Low prices were secured only when the American and British iron markets were so disorganized that the Canadian producer was forced to lower his prices, at which time he made full use of the tariff.

§ 8. Probably one of the most objectionable features of protection was the use of specific and compound duties, with an *ad valorem* minimum of 35 per cent in many cases. The stated object of these duties was to prevent undervaluation. Specific duties were warmly befriended as the only fair and sensible duties on pig iron, since it is very often impossible for the appraiser to determine the value

[1] *Canadian Mining Review*, vol. xv, p. 72.

of pig iron, and since specific duties do away with all possibility of fraud. Further, as a specific duty prevents the importation of the lower grades of pig iron, the quality of work is improved.[1] Though the Customs Act provides for the use of sworn invoices, where it is necessary to secure the exact price of the goods, this does not always result in the specific duties preventing fraud. The great objection to specific duties lies in the fact that with the marked decline in prices that took place between 1880 and 1896, the protection afforded gradually increased, and amounted, as Sir Wilfrid Laurier said in 1894, to between 40 and 60 per cent for such lower grades as Alabama coke iron. That Mr. Foster was unable to explain and justify specific items in the tariff of 1894[2] makes one suspicious that, as the farmers have often claimed, the schedule was framed by some committee of manufacturers and each item given the protection asked without further question. Altogether, one gathers the impression that the claim that these specific duties were used to obscure the real degree of protection has a considerable basis of truth. In many cases the duties were really prohibitive of importation; at best they made an estimate of the amount of protection given almost impossible.

§ 9. As has been said, it was expected that the importation of iron and steel would largely discontinue. Let us turn, then, for a moment to the influence of the tariff, especially that of 1887, on these imports. Altogether there was a decrease in imports from $75,251,232 for the period 1882 to 1886 to $70,972,717 for the period from 1889 to 1893.[3] Iron and steel goods, partially manufactured and for use as raw materials, were imported in large amounts, averaging about $5,000,000 annually from 1877 to 1896. Imports of iron and steel goods ready for consumption

[1] *Canadian Engineer*, vol. III, p. 290. [2] *Debates*, 1894, p. 2513.
[3] *Canadian Mining Review*, vol. XIII, pp. 42–43.

amounted to $6,000,000 in 1877, $10,000,000 in 1887, and $5,000,000 in 1896.[1] Meanwhile the unfavorable balance of trade had fallen from $24,000,000 in 1877 to $17,000,000 in 1882, to $20,000,000 in 1888, and had become a favorable balance of $3,000,000 in 1896.[2] The character of Canada's trade relations had changed, but so far as figures show, despite the iron trade rather than because of it.

If we turn to pig iron in particular, we find an actual increase of importations. In 1884, 52,184 tons were imported; in 1887, 50,214 tons; in 1890, 87,613 tons; in 1893, 63,522 tons.[3] Of course this continuance of importation of iron can be easily explained. Even if furnaces could have been built to produce all the country's consumption of iron, approximately 100,000 tons in the nineties, which could have been produced by one large modern furnace, or by two or three furnaces of that period, capitalists would have had little temptation to erect the furnaces. The market was very scattered, and very apt to be an aggregate of small orders. In some work, such as castings, Canadian iron could scarcely be used at all because Canadian furnaces did not turn out the necessary grade. No furnace could turn out all grades from Bessemer to foundry iron. In short, there was little hope for good returns on an investment in the Canadian pig-iron business, and no matter what the ambitions of Canadian producers, Canada could not have got along well without importing some American or British pig iron.

§ 10. Opposition to the duties on pig iron, scrap iron, and bar iron was particularly strong. Very important interests objected to the principle that these raw materials for nearly every other Canadian industry should be taxed. On these grounds Mr. Bourassa and Mr. Charlton[4] ob-

[1] *Canadian Statistical Year-Book*, 1904.
[2] *Canada Year-Book*, 1912, p. 94.
[3] See Appendix G.
[4] *Debates*, 1879, p. 1447.

jected to the duties in 1879.[1] In 1881 Mr. Burpee, a rolling-mill owner from St. John, New Brunswick, and in 1887, J. Pender & Co.,[2] of St. John, protested that the prices of these raw materials were rising and were likely to ruin certain branches of the trade. In 1892 Mr. J. V. Hodgson, of Montreal, the only manufacturer of wrought-iron tubing in Canada, closed his works indefinitely because the high duty on his raw material made the industry unprofitable. Likewise, the manufacturers of agricultural implements, the most important producers of finished products, complained that the rolling mills had prospered under the protection of 35 per cent, until, becoming too extensive for the consuming capacity of the country, they had failed and later formed combinations. Thereafter the rolling mills fully utilized the duties on bar iron, getting not only what was intended for themselves, but also what was intended for the miners, the pig-iron producers, and even the protection that was intended for the producers of finished products. Accordingly, the producers of finished products wanted to have the duties on bar iron reduced to enable them to enter the domestic and export trade on fair terms with other countries.

One can easily see how these high duties would injure the production of finished products, but it is not so evident at once that the producers of pig iron and puddled bars could not get the full benefit of the increase of duties after 1887. The secret lies in the relatively low duty on wrought scrap iron, which was admitted at $2 per ton (the previous duty on both pig iron and scrap), while pig iron and puddled bars, with which scrap iron came into competition, were charged $4 and $9 respectively after 1887. The Government naturally intended to encourage the manufacture of bar iron from puddled bars made in Canada from Canadian pig iron, but the discrimination in favor of imports of scrap iron went far to nullify the additional protection afforded

[1] *Debates*, 1882, p. 1223. [2] *Ibid*, 1887, p. 1213.

pig iron and puddled bars. The rolling-mill interests were able to secure an abundance of raw materials at prices much lower than were profitable for iron smelters and manufacturers of puddled bars. In fact, nearly all the raw material for bar iron and casting work was imported. Thus, deprived of a profitable market for forge iron and puddled bars, capitalists did not dare to establish puddling works commensurate with the Canadian consumption. As a consequence, no bar iron was manufactured from Canadian puddled bars until after 1894, when the scrap-iron duty was raised to $4 per ton. In turn, the development of the pig-iron industry was limited to the demand for pig iron for foundry work and for steel-making purposes. Thus, although the bulk of the bar iron used in Canada was turned out by Canadian mills, the few Canadian blast furnaces and puddling works were not continuously in blast for any length of time.[1]

Those interested in pig-iron production soon began to protest against this apparently unjust discrimination. They argued that it was impossible to manufacture good bar iron from wrought scrap, and claimed that merchant iron rolled from old rails, tubes, boiler plate, old ship plates, railroad springs, discarded axles, and similar material was in no respect equal to iron made from puddled bar, and that every manufacturer who used iron made from scrap knew to his sorrow that the product was never regular in texture and grain, had hard and soft spots in it, and was reedy and open-grained. They believed that had the mill proprietors been forced by a heavy duty on scrap iron to put in puddling furnaces or to buy puddled bars from pig-iron producers who turned pig iron into bars, both the producers and consumers of finished products would benefit by reason of the better quality of finished goods. The producers of pig iron argued that the rolling-mill men had even been forced to invest in special plants for the treat-

[1] *Iron Age*, vol. LI, p. 430.

ment of scrap iron.[1] In reply the rolling-mill owners said that, as a matter of fact, to secure a satisfactory product, scrap iron had to be mixed with pig proper, and thus scrap iron to some extent facilitated the use of pig iron.[2] The same rolls could be used whether bar iron, scrap iron, or puddled bars were used, and even if the duty on scrap were raised to a prohibitory point, the domestic producers of pig iron could not have profited greatly, since much of the scrap iron was purchased in the country, and since producers of puddled bars had not the facilities to produce a large enough output at the price at which bars could then be imported.[3]

Down to 1892 there were but three blast furnaces in Canada; two in Quebec, and one in Nova Scotia. But, as we shall see, the Canada Iron Furnace Company had taken over the plant at Radnor in 1889, the New Glasgow Coal, Iron and Railway Company built a furnace in 1892, and the Hamilton Blast Furnace Company was contemplating building in 1893. The necessity of increasing the duty on scrap iron was urged with new vigor. It was proposed, in 1892, that the difficulty should be rectified by naming a date on which scrap iron should be charged the same duty as puddled bars or soft-steel billets, and that, in the mean time, a bounty should be paid on puddled bars and steel billets made in Canada from Canadian pig iron.[4] When the tariff was altered in 1894, the duty on scrap iron was advanced to $3 per ton for one year, and thereafter to $4. Since the duty on puddled bars was reduced from $9 to $5, a bounty of $2 per ton on puddled bars produced in Canada from Canadian pig was provided for. The Government thus aimed at stimulating the pig-iron industry and the production of puddled bars without greatly increasing the cost of the raw material of rolling mills. The amount of scrap iron imported promptly fell off, from 569,907 tons in

[1] *Canadian Engineer*, vol. I, p. 308. [2] *Debates*, 1888, p. 498.
[3] *Iron Age*, vol. LIII, p. 357. [4] *Canadian Engineer*, vol. I, p. 308.

1893, to 91,169 tons in 1897.[1] Part of this decrease was due to the depression of 1893 to 1897, as well as to the increased use of steel; yet the scrap-iron duty undoubtedly had some effect. Moreover, the bounty on puddled bars seems to have stimulated production, because in 1895 the Ontario Rolling Mills put in a puddling furnace with a capacity of four tons a day,[2] and the Londonderry Iron Company was able to make contracts for puddled bars with several Canadian bar-iron manufacturers.[3] But judgment as to whether this change in 1894 was a wise one may be deferred, pending a consideration of the history of the industry and the value in general of the protective policy.

§ 11. The iron duties were without question a source of great difficulty to the party in power. Interests within the industry were easily antagonized by discrepancies. The duties on finished products fell heavily on the consuming public; those on secondary products, such as bar iron and steel, were a burden to the consuming manufacturers; and those on scrap iron, pig iron, and puddled bars were opposed by the rolling-mill interests. The producers of pig iron were asking for increased protection on pig iron and puddled bars and higher duties on wrought scrap, but it was quite impossible to increase these duties to the satisfaction of the pig-iron producers. The desirability of having free or cheap raw material, a natural corollary of the national policy, was particularly applicable to the importation of iron and steel. Yet the primary industry was demanding considerable attention. Every one desired development, and political interests demanded assistance. A certain amount of protection was, therefore, accorded, especially in the revision of 1894.

But earlier, as we have seen, the bounty system was

[1] See Appendix G, Table II.
[2] *Canadian Mining Review*, vol. XIV, p. 11.
[3] *Ibid.*, vol. XV, p. 105.

introduced as an easier solution of the difficulty. As early as 1883 direct and assured aid was given in the form of bounties on Canadian pig iron made from Canadian ore. These obviated the necessity of a rearrangement of the whole iron and steel schedule. It was argued that, as there were only three furnaces in operation, producing not more than 29,593 tons out of a consumption of 81,777 tons in 1884,[1] the production of pig iron in Canada could not supply the total demand for several years.[2] The granting of the bounty on puddled bars in 1894 was intended to offset the reduction of the duty from $9 to $5.

The Liberal opposition objected to this phase of the national policy as vigorously as it opposed the increase of duties in 1879 and 1887. It was pointed out that local feeling had prompted this bounty legislation in favor of Nova Scotia interests, and that bounties were extended for the convenience of the manufacturing interests.[3] The Liberal Party also argued that to extend the bounty law beyond the life of one parliament was a political injustice.[4] More important was the objection that the system involved a very considerable increase of taxation, while the industry seemed to undergo but slight development and entirely failed to shut out imports. Altogether, $781,221.72 was paid out by the Dominion during the years 1883 to 1897 on an output of 471,066 tons. In no one year did the output exceed 62,522 tons. Only three times did it exceed 40,000 tons, and in 1891 it fell as low as 20,153 tons. Imports of pig iron never fell below 28,000 tons, and only four times below 45,000 tons. In other words, over half of the total consumption of pig iron was imported.[5] That the bounty payments did not increase so much as was feared by the Liberal Party, and that the output increased even

[1] *Canada Year-Book*, 1908, p. 519; see Appendix B, Table I.
[2] *Debates*, 1883, p. 711.
[3] *Iron Age*, vol. LXX, September 18, p. 19.
[4] *Debates*, 1890, p. 2828. [5] See Appendix B, Table I.

less, is evidence that for some reason the system of bounty payments had failed to realize all the success hoped for it.

§ 12. There is ample reason, then, for questioning the wisdom of protecting the various branches of the iron industry during the period under consideration. Already a number of counts stand against the policy. Contrary to expectation, the unfavorable balance of trade was not wiped out by the duties on iron and steel products, which were imported in very large quantities; prices were advanced behind the wall of transportation charges and customs duties, and if necessary, combination was resorted to.

Even within the industry there was disagreement; the producers of primary products wanted protection, and the producers of finished products wanted either low duties on their raw materials or higher compensatory duties or their equivalent on the finished products. The bounty system was a political makeshift, adopted and modified from time to time according to the necessities of the situation. The use of specific duties deceived the public and possibly the legislators themselves. Uncertainty regarding the system was not the least evil.

So much for the standard objections to the system — objections that were applicable to the Canadian policy prior to 1897. But if the system had really developed a large and important industry, some or all of these evils might have been forgiven. Although it is a common fallacy to regard the wisdom of a protective policy as finally proved if it can be shown that an extensive industry has been thereby produced, or, more commonly, if it can be proved that the industry grew up during a period of high duties, rarely are the costs of the system to the taxpaying and consuming public given due consideration. Rarely do politicians or manufacturers clamoring for protection consider the various outside factors that may have contributed to the expansion of the industry, or the actual extent to

which the protective system alone may have been responsible.

As only two furnaces in Quebec and one in Nova Scotia existed in 1879 in all Canada, the protective policy had ample opportunity to prove its value by stimulating the growth of the industry. To learn whether or not it succeeded is a partial purpose of the following chapter, devoted as it is to a consideration of the extent and the causes of the development of the Canadian iron and steel industry from 1879 to 1897.

CHAPTER VI

THE DEVELOPMENT OF THE INDUSTRY[1]

§ 1. Of the iron and steel plants still in existence in 1879, that at Londonderry, under the control of a company formed to make a commercial test of the Siemens open-hearth process, was by far the most important. It could not, however, be called a success. A large plant, including ten furnaces, had been built at an expenditure of $1,250,000. As the Bessemer process was then the only method accepted for the production of steel on a large scale, there was very little demand for the large output the works were designed to produce.[2] The accidental location of the Acadia Iron Furnace at Londonderry seems to have given occasion for the choice of a situation for the plant of this new company, which was against all successful working. Since charcoal was no longer used as fuel, the woodlands were of little use. Coal, which was never discovered on the property, had to be brought twenty-four miles from Springhill, or fifty miles from Pictou.[3] At this time only one Nova Scotia colliery mined suitable coal, and the owners had the only coke oven in the country; so they supplied coke at their own price. When, one day, an explosion closed this mine, coke was not to be had at any price, and the blast furnace had to be shut down with a heavy loss. After this the iron company built coke ovens of its own and became to some extent independent. When finally a coal mine was purchased and fully equipped, the coal, after many trials, was found almost unfit for use. There was a considerable supply of ores and fluxing materials, but the ores were hard

[1] For the geographical location of the plants described see the maps in the Appendix.

[2] *Colliery Guardian*, vol. LXXXI, p. 367.

[3] *Ibid.*, p. 367.

and a mixture with other qualities was almost a necessity.[1] Instead of running a general store from which a considerable revenue might have been secured, the company granted the privilege to some outsider who took advantage of his opportunity to overcharge. It is not surprising, then, that in spite of the protective duties of $2 a ton and a bounty of $1.50 per ton on pig iron, the company was in liquidation by 1883, and the plant was for sale in 1886.

In 1887, the Londonderry Iron Company, which was formed to take over the plant, began to turn out large quantities of puddled bars and to roll them into bar iron. For a time the "Siemens" brand of bar iron was recognized as having high qualities, and it compared favorably with the ordinary imported iron. The puddled bars, too, were of good, strong quality and formed an excellent mixture with the best grades of Scotch iron, which were more open and fluid in nature.

Shortly after this scrap iron came into almost universal use for the manufacture of bar iron in Canada, and the company was forced to close the puddling furnaces, until 1894, at which time the duty on puddled bars was reduced, the duty on scrap iron increased, and a bounty of $2 per ton on puddled bars given as compensation.[2] The production of pig iron continued to be a source of difficulty. The local supply of ore would not keep more than one furnace going; ores from Woodstock, New Brunswick, were phosphorous and those at Londonderry, while practically pure, were magnetic, and, therefore, hard to smelt.[2] Royalty claims on ore deposits in the Nictaux-Torbrook field were secured, and in 1891 an additional furnace was lighted to smelt these ores, which were supplied by the Torbrook Iron Company.[4]

[1] *Canadian Mining Review*, vol. v, pp. 8–9.
[2] *Canadian Mining Manual*, 1897, pt. II, p. 74.
[3] *Monetary Times*, vol. XXIV, p. 595.
[4] *Canadian Mining Review*, vol. XXI, p. 2.

The company could not compete in the open market at current prices for pig iron; so it used a large part of its product at its own finishing plants, the pipe, axle, and forge foundries, and the rolling mill.[1] In 1890 the works were partly rebuilt and operated more economically by a new manager.[2] An increase in protection in 1894 led to the building of a new pipe foundry.[3] Yet, from 1894 to 1896, a time of low prices, the company was continually in financial difficulty. In 1895 it had a deficit of $60,306. A temporary disadvantage, occasioned by the supply of inferior fuel, made matters worse. When a dirty seam of coal had been struck by the Acadia Coal Company which furnished the coke, operations were retarded and the furnace more or less impaired. Drought reduced the water supply and caused frequent stoppages. The product was therefore of low grade. Moreover, a large stock of merchant iron on hand represented an embarrassing loss of interest, and current indebtedness was in excess of liquid assets. The company had either to dissolve or right itself by means of some internal rearrangement.[4] In 1896 there was a slight improvement in conditions, and all departments were employed to their full capacity. But the prosperity was only temporary. The company was soon hopelessly embarrassed and unable to pay its fixed capital charges.

§ 2. Quebec, too, maintained its reputation as an iron-producing province. Shortly after 1875 Mr. George McDougall, of Montreal, leased the car-wheel foundry at Three Rivers,[5] and, to supply the charcoal iron necessary, bought the St. Maurice Forges, which he operated until bounties were granted in 1883.[6] Since the supply of iron was still insufficient, he built two charcoal furnaces at

[1] *Bulletin of the Iron and Steel Association*, vol. XXIII, p. 268.
[2] *Monetary Times*, vol. XXIV, p. 193.
[3] *Canadian Mining Review*, vol. VIII, p. 268.
[4] *Iron Age*, vol. LVII, p. 863. [5] Bartlett, *op. cit.*, p. 519.
[6] *Canadian Mining Manual*, 1897, pt. II, p. 60.

Drummondville as early as 1880 and 1881. Both furnaces produced charcoal car-wheel iron from limonite or bog ores found in the vicinity. Wood, procured in the neighborhood, was converted into charcoal at the works. The whole output of 5000 tons a year was manufactured into high-grade car wheels at Three Rivers and Montreal.[1] These furnaces, although not of great importance, if the quantity of the product be taken as an index, were nevertheless a valuable source of iron of a special grade, and so continued in operation throughout the period in question.[2]

Before 1879 the manufacture of iron at Radnor had been gradually discontinued, because the owners were handicapped by lack of shipping facilities and of capital. It also seemed impossible to secure any large and regular supply of iron ore; the capacity of the furnace was limited and the operations irregular. As a result, it was difficult to manufacture any great quantity of the special grade of iron which was made into car wheels at Lachine, Quebec, or at St. Thomas, Ontario.[3]

The Canada Iron Furnace Company was formed, nevertheless, in 1889 to acquire the properties, rights, and all accessories, which included the forges, sixty workmen's cottages, a limestone quarry, perfected water power, a railroad line, bridges and sidings, a car-wheel shop and shipping dock at Three Rivers, property for charcoal kilns and water power at Grandes Piles, Quebec, the ore deposits at Lac à la Tortue, with ore rights over 100,000 acres of bog ore-bearing lands in the St. Maurice district.[4]

Prospecting for an increased supply of ore was commenced and pushed for a year. Many leases and purchases were made in anticipation of future development. Since the results at the works were good, and a demand existed

[1] Bartlett, *op. cit.*, p. 520. [2] *Canadian Engineer*, vol. III, p. 263.
[3] P. Griffin, "Canada Iron Furnace Company," *Transactions of the American Institute of Mining Engineers*, vol. XXI, p. 974.
[4] *Canadian Mining Review*, vol. XII, p. 45.

for the product, the company decided to double its output, and after operating the old stone stack for two years, built a new furnace in 1892.

Many difficulties had to be overcome. American furnacemen could purchase raw material, such as ore and charcoal, in the open markets, but Canadian companies had to provide workmen for the entire cut of wood, had to transport the wood to the charcoal kilns, and the charcoal to the furnaces, to mine the full supply of ore, and quarry all the limestone.[1] The farmers who brought in ore gave trouble by refusing to conform to the English standards of weights and measures.[2] Nevertheless, the nature of the product was such as to make its production profitable. It was consistent in quality and well tested by actual results. It was especially valuable to foundry-men because it remedied shrinking and produced true-grained and very strong castings.[3] With the rapid growth of the transportation industry in Canada, the demand for such a product naturally grew. In fact, in 1896 the Canadian railroads, with few exceptions, were using car wheels made of this iron, and the company was able to open up foreign markets in the United States and Europe.[4] Labor for securing ore and wood, supplied in the slack seasons by the *habitants* of the district, was cheap and abundant. Excellent water power for operating the ore and stone crushers and for pumping water was secured from the Rivière au Lard. The abundance of wood suitable for charcoal was unquestioned and the bog ore deposits proved quite satisfactory.[5] The company found it practicable to establish wood and ore deposits from which shipments might be made by rail to the furnace, seventy-five to one hundred miles away.[6] It is not surprising that, under such conditions, the company had considerable success.

[1] *Canadian Mining Review*, vol. XII, p. 47. [2] *Ibid.*, p. 47.
[3] *Canadian Engineer*, vol. III, p. 262.
[4] *Monetary Times*, vol. XXIV, p. 1302.
[5] *Ibid.*, p. 303. [6] Griffin, *op. cit.*, pp. 977–78.

§ 3. One rather unprofitable and discouraging enterprise, one failure, and two other small but relatively successful plants have been described. We find in this period the first appearance of what has since become one of the most important of Canada's iron and steel plants, that at Trenton and New Glasgow, Nova Scotia.

Previous to 1879 a fairly prosperous industry had grown up at Trenton, Nova Scotia, in the hands of the Nova Scotia Forge Company. Then wrought and scrap iron were used as raw material. But a change was going on in the steel industry, and mild steel began to replace wrought iron in the manufacture of car axles and in general forge work. This fact, together with the difficulty of securing raw material for a rapidly expanding trade, suggested the advisability of making steel from imported scrap steel and pig iron. After a careful survey of the situation, the management decided to embark on a new enterprise, and in 1882 formed the Nova Scotia Steel Company to manufacture steel by the Siemens-Martin open-hearth process. After a year of construction work the first steel ingots were cast in 1883.

The original forge company soon became a large buyer of steel ingots and billets from the new concern, which was in turn dependent on the forge for repairs and machine work. Interdependence, community of interest, and the desirability of assuring economy of operation led to the amalgamation of the two companies as a joint enterprise, known as the Nova Scotia Steel and Forge Company.[1] After extensions had been made, an excellent business was carried on in railway fishplates, plough plates, nail plate, bars and angles, tie plates, steel for agricultural implements, merchant steel in rounds, flats, and squares, angles and special sections, rivet steel, tramway and pit rails.[2]

But this system of working imported pig iron and scrap

[1] *Industrial Canada*, vol. II, p. 328.
[2] *Canada Mining Review*, vol. VI, p. 97.

material, quite satisfactory for a small output, did not allow of any great expansion. The company thought it undesirable to be dependent on the local supply of scrap iron and imports of pig iron, and decided to manufacture its own pig iron to make sure of its raw material.[1] Consequently, in 1888, when the iron ores of the East River district, Pictou County, were receiving considerable attention, the preliminaries were instituted for building a blast furnace at Ferrona, or North New Glasgow.[2] As the construction of the blast furnaces would cost $500,000, exclusive of mining properties and operation of iron mines, and as a section of the directorate was unwilling to assume the risk involved in undertaking so extensive a project, a new company, the New Glasgow Coal, Iron and Railway Company, was formed. The company acquired sufficient brown and red hematite ores by purchase and lease to warrant the establishment of a modern blast furnace of large capacity.[3] The mines were thirteen miles from the Intercolonial Railway; so a railway was built connecting the furnace with the mines and limestone quarry. The site of the ironworks was at Ferrona, an admirable spot at the junction of the two railways. The contract for a blast furnace was let and work was begun in 1891. Storehouses, blacksmith and carpenter shops, coal and ore washing plants, and coke ovens were also installed. By 1892 the company was supplying pig iron to the Nova Scotia Steel and Forge Company, and foundry iron to most of the foundries in the Province. The forge company took more than half of the output.[4]

The product was of very good quality for the manufacture of steel, but the manganiferous character of the ores around New Glasgow gave the company some trouble in the manufacture of foundry pig iron. To solve this diffi-

[1] *Industrial Canada*, vol. II, p. 328.
[2] *Debates*, 1894, p. 2346.
[3] *Industrial Canada*, vol. II, p. 328.
[4] *Canadian Mining Review*, vol. XII, p. 115.

culty, the company acquired, in 1894, a large iron ore deposit on Bell Island, in Conception Bay, Newfoundland. The mines were opened, a double-track railway was built to the shipping pier, and suitable mining machinery was installed. When storage pockets and piers had been built, by December, 1895, ore was shipped to Ferrona, and the proportion of manganese was brought down to a suitable percentage for foundry iron.[1] Consequently an outlet was found for the other half of the output.

The existence of the steel-works was a very great advantage. The community of interest and interdependence of the two companies is a very interesting and important feature of the development of the iron industry of Nova Scotia. The Nova Scotia Steel and Forge Company, with its increasing demand for structural steel, was willing and glad to absorb an increasing output of pig iron.[2] On the other hand, the more the steel company expanded, the more the blast furnace company prospered. Thus, the New Glasgow Coal, Iron and Railway Company weathered with relative ease the depression and American competition in the period 1893 to 1896.[3] The obvious community of interest suggested the advisability of consolidating the two companies. They amalgamated in 1895 under the name of the Nova Scotia Steel Company. When the steel plant was extended, the blast furnace was able to operate more economically by lengthening the runs in making steel material.[4]

Wonderful progress had been made in little more than a decade. A small forge works had expanded into a steel plant using imported scrap and pig iron, and this into a fully rounded-out iron and steel plant carrying on all operations from the mining of ore and coal to the manufacture of quite unexcelled forgings on a relatively extensive scale.

[1] *Canadian Mining Manual*, 1897, pt. II, p. 35.
[2] *Canadian Mining Review*, vol. XI, p. 35.
[3] *Ibid*, vol. XIV, p. 4.
[4] *Ibid.*, p. 256.

§ 4. All the iron and steel plants of this period mentioned so far belonged to Quebec and Nova Scotia. Ontario, not to be outdone in the end, bided her time. For nearly forty-one years not a blast furnace had been in operation in Ontario, and during the long interval the ore mines had been idle most of the time. Indeed, so little interest was felt that men had ceased to look for new deposits or to operate old mines.[1]

In the mean time manufacturers in Ontario had been dependent on outside supplies of pig iron. But in 1893 some enterprising Americans, endeavoring to fix a location for smelting-works in Ontario, accepted Hamilton's offer of a free site, $40,000 if the company would expend $400,000 on smelting-works with a capacity of 150 tons per day before December 31, 1894, and a further bonus of $60,000 if the company would construct steel works costing $400,000 by December 31, 1896.[2] The Hamilton Blast Furnace Company, which was immediately formed, erected a casting house in 1894, but the furnace shell, after it had been partly built, was blown down, and reconstruction was for the time being stopped because the Grand Trunk Railway spur to the works was not yet completed.[3] But a progressive community like Hamilton was not to be robbed of its new venture. The time for building the plant was extended, and by July, 1895, a blast furnace plant possessing all modern improvements to secure the best economy of fuel and handling of materials was practically completed.[4] In 1897 a steel plant, a spike factory, and puddling furnaces were added.

It had been the intention of the company to use Ontario ore altogether in order to obtain the full benefit of the Ontario and Dominion bounties. But as the lean ore

[1] *Journal of the Iron and Steel Institute*, 1897, no. II, p. 594.
[2] *Iron Age*, vol. LI, p. 1292.
[3] *Canadian Mining Review*, vol. XV, p. 38.
[4] *Monetary Times*, vol. XXVI, p. 610.

brought from North Hastings contained too much sulphur and had to be roasted, a large part of the output ranked as Number 3 iron.[1] A wider range of ores was needed if the company was to produce a grade of iron more suitable for the all-round requirements of the Canadian trade.[2] New York and other ores which were tried were found to be of poor quality, inasmuch as they produced too much slag. Lake Superior ore was, therefore, used and though it drew no bounty, the financial result was satisfactory. The project was a success from the first.[3]

§ 5. Meanwhile a number of attempts to smelt iron ore in Ontario had proved unsuccessful. In 1881 American interests began to talk of smelting iron in the Ottawa Valley.[4] The Canada Iron and Steel Company of Montreal was incorporated to test an invention for making wrought iron direct from ore by a "blowpipe process,"[5] but after experimenting for a year, at a cost of $70,000, the Company abandoned the scheme.

In 1882 several developments were considered. Chicago capitalists began to build a blast furnace at Furnace Falls, in the county of Haliburton, Ontario. The situation offered exceptionally good timber limits, excellent water power, proximity to flux, and railway connections with the market. But after an expenditure of $35,000, the work was stopped for lack of capital to complete the furnaces.[6]

In Nova Scotia, Thomas Burrows, intending to build a furnace in Pictou County, bought a plot of ground at St.

[1] *Monetary Times*, vol. XXVI, p. 1464.

[2] *Iron Age*, vol. LVII, p. 1306.

[3] *Monetary Times*, vol. XXVI, p. 146.

[4] *Debates*, 1882, p. 7224.

[5] The iron ore was ground fine and mixed with flux, and then introduced into a long cylindrical blast furnace. The intense heat from burning oil which was used as fuel melted the ore. On reaching the puddling chamber, the iron gathered into balls, which, when ready, were taken out and hammered into blooms.

[6] Bartlett, *op. cit.*, pp. 522–23.

Paul's, and set prospectors and miners to work. New parties who entered the field changed the course of the river, cut off the supply of water, and ended the attempt.[1]

In 1883 the London Steelworks Company of London, Ontario, built works containing a thirty-ton Siemens melting furnace, and a rolling mill, to make steel castings and a patent car wheel, as well as bar steel, steel flats and rounds, coil spring, and the best qualities of bar iron. In 1884 a puddling furnace and steam hammers were put in to make steel by a new process; but, like the earlier steel plant at Quebec, it was ahead of the times. The company failed and the place was closed.[2]

The Midland Railway and Iron Company was formed in Nova Scotia in 1888, but after working six months, it stopped operations and nothing further was done.[3] In 1889 Americans proposed to erect blast furnaces to smelt ores found north of Lindsay, Ontario, if the local authorities would give a bounty and if the Government would assist the extension of the Irondale and Bancroft Railway, but nothing further was heard of the suggestion.[4] In the same year the Nova Scotia Coal, Iron and Railway Company was formed to develop the mines in Pictou County, Nova Scotia. Analyses were laid before British and American capitalists, but without success; they were afraid to invest in the Canadian iron industry.[5] In 1892 capitalists, including Charles Rogers, Robert Jaffray, and G. A. Cox, were organizing a company to build a blast furnace at Toronto. But when they could not secure an alteration of the bounty system to include iron made from all ores, the proposal was abandoned.[6] In 1895 there was talk of an iron and steel plant to manufacture pig iron and steel and finished articles in Kingston, which was asked to provide a site and

[1] *Canadian Engineer*, vol. II, p. 104.
[2] Bartlett, *op. cit.*, p. 535.
[3] *Canadian Engineer*, vol. II, p. 105.
[4] *Monetary Times*, vol. XXIII, p. 465.
[5] *Canadian Engineer*, vol. II, p. 104.
[6] *Iron Age*, vol. II, p. 1080.

a loan of $250,000, secured by a mortgage on the stock, plant, and prospective bounties, but the whole affair fell through.[1]

There was to be one more attempt to establish a second iron plant in Pictou County, Nova Scotia. In 1890, Mr. M. E. Sjostedt headed a prospecting company to ascertain whether a charcoal iron furnace could be suitably located in Nova Scotia. They chose to make charcoal iron because of the demand for car-wheel manufacture, at a time of extensive railway construction.[2] In 1891 the Pictou Charcoal Iron Company was formed to acquire several deposits of excellent brown hematite on the line of a new branch railway from Bridgeville to the Intercolonial Railway. Large tracts of timberland were also acquired. At last the company decided to build a blast furnace at Bridgeville in close proximity to the ore and limestone beds. This situation afforded the advantage of a short haul of ore and fluxes to the furnace, large tracts of hardwood in the immediate vicinity and along the Intercolonial and the Nova Scotia Midland Railways, and the two railways gave ample outlet for the product. The foundation of a furnace was laid in the winter of 1891, but unexpected difficulty in securing funds for the enterprise retarded progress, and the works were not built until 1892, when a second-hand furnace and machinery were installed, and the manufacture of charcoal iron was begun.[3] The bounty on puddled bars resulted in the addition of a puddling plant in 1894.[4] In 1895 the company instituted a steel converting plant to turn the larger part of their material into high quality agricultural implement steel for the home market.[5] Lack of orders for charcoal pig iron, lack of capital, and dullness of trade ended the active work of the company in 1896, mining operations

[1] *Canadian Mining Review*, vol. XIV, p. 95.
[2] *Ibid.*, vol. XII, p. 30.
[3] *Ibid.*, pp. 2-3.
[4] *Canadian Mining Manual*, 1897, pt. II, p. 79.
[5] *Canadian Engineer*, vol. III, p. 263.

alone being carried on for a short time to supply the Nova Scotia Steel Company.[1]

§ 6. Meanwhile, the Canadian rolling mill and finishing industry had experienced considerable development. In 1880 the Morrow Machine Screw Company of Ingersoll, and the St. John Bolt and Nut Company of New Brunswick,[2] were formed. In 1881 F. D. Bigelow built a nail factory, which was taken over by the Pillow and Hersey Company in 1887.[3] In 1883 the Metropolitan Rolling Mills were incorporated and a plant built in Montreal.[4] In the same year the Montreal Steelworks were opened; and shortly after the Dominion Bridge Company and the Dominion Wire Rope Company were incorporated.[5]

The Coldbrook Rolling Mills of St. John, New Brunswick, which had not been in operation for some years, were bought in 1884 by Messrs. Burpee and put in operation.[6] In 1885 the Halifax Rolling Mill Company built in Halifax,[7] and Messrs. J. and W. Chesley built a rolling mill in St. John. In 1888, the Montreal Rolling Mills added bar and plate mills to the plant as well as a wrought-iron pipe plant. The Canadian Pacific Railway was making all its own locomotives; a screw, carriage bolt, and nail factory was built, and a pipe foundry and bridge works were built at Hamilton;[8] the Montreal Car Wheel Company was incorporated by the Drummond interests;[9] and the Ontario Rolling Mills Company built a new plant at Swansea.[10] In 1889 the Montreal Steel works were incorporated by K. W. Blackwell and J. R. Wilson as the Canada Switch Manufacturing Company.[11] The Portland Rolling Mills added to their

[1] *Canadian Mining Review*, vol. xv, p. 219.
[2] *Canadian Mining Manual*, 1895, p. 276.
[3] *Ibid.*, p. 253.
[4] *Ibid.*, 1893, p. 251.
[5] *Ibid.*, 1893, p. 258.
[6] Bartlett, *op. cit.*, p. 536.
[7] *Ibid.*, p. 542.
[8] *Debates*, 1888, p. 1036.
[9] *Canadian Mining Manual*, 1895, p. 274.
[10] *Ibid.*, p. 252.
[11] *Ibid.*, p. 275.

plant a puddling furnace, five heating furnaces, three trains of rolls, two spike machines, and a fifteen-ton hammer.[1] The Ontario Lead and Barb Wire Company bought the plant of the Hamilton Steel Wire Nail Company and removed it to Toronto, where an extended plant was constructed.[2] The Belleville Rolling Mills Company was formed to roll, manufacture, and sell iron and steel and their products.[3] In 1890 the Drummond-McCall Pipe Foundry was incorporated,[4] and the Caledonia Ironworks for manufacturing engines and boilers was put on its feet by J. McDougall & Company at Montreal.[5]

In 1893 J. Rhodes Curry & Company bought the car-wheel foundry and machine shop of J. Harris & Company, St. John, and turned out the first Canadian cars at Amherst, Nova Scotia.[6] The McDonell Rolling Mills Company built works at Sunnyside.[7] In 1894 the Ontario Rolling Mills Company, encouraged by the increased duty on scrap iron, put in a four-ton puddling furnace.[8] In the same year the Gananoque Nut Factory was put in operation.[9] The chief products of these rolling mills were merchant and other bar iron, nail plate, mine rails, ship and railway spikes, bridge bolts, car axles, fishplates and knees for ships, cut nails, horseshoes, horseshoe nails, bolts and nuts, band iron, steel forgings, rivets, and washers.[10] This history of the finishing industries does not cover the full number as a consideration of the census figures for 1881 and 1891 will show.[11] In

[1] *Canadian Mining Manual*, 1895, p. 275.
[2] *Monetary Times*, vol. XXIII, p. 248.
[3] *Ibid.*, p. 778.
[4] *Canadian Mining Review*, vol. X, pp. 45–46.
[5] *Canadian Engineer*, vol. II, p. 80.
[6] *Iron Age*, vol. LII, 1893, p. 27.
[7] *Canadian Mining Manual*, 1895, p. 251.
[8] *Iron Age*, vol. LVI, p. 25.
[9] *Debates*, 1894, p. 2537.
[10] *Iron Age*, vol. LIII, p. 460.
[11] See Appendix C, Table I. As the figures for 1901 cover establishments employing five employees or more, and as there was probably little advance between 1891 and 1897 owing to the industrial depression, the figures for 1901 are of little value. The figures for 1881 and 1891 give fairly satisfactory indication of the growth down to 1897.

1881 there were twenty-six, and in 1891, twenty-nine establishments producing a restricted number of iron and steel products, chiefly rolling-mill products, nuts, bolts, nails, hinges, and kindred articles. Between 1881 and 1891 six bridge-building plants were established, and the number of wire and wire-fencing plants was increased from seven to fifty. Railway supplies received the attention of three plants in 1891, as compared with a single plant in 1881. The figures showing the values of the products give even more adequate evidence of the advance in the production of finished iron and steel products. It was generally felt in 1893 and 1894 that the capacity of existing Canadian mills was more than ample to supply the domestic demand for most rolling-mill products.[1] Competition, in fact, was so severe that amalgamation and combination became necessary.

§ 7. It is evident that, during the period 1874 to 1897, forces were working to develop an iron and steel industry. By 1897 the primary industry had begun to assume a promising importance. Success had attended the operations at Radnor and at Drummondville, Quebec. The annual output had advanced from an average of about 25,000 tons for the early eighties to an average of 45,294 tons for the years 1893 to 1897. The production of both pig iron and steel had begun at New Glasgow and Trenton in Nova Scotia, with very satisfactory results, and at Hamilton, Ontario, a beginning had been made in the development of what has since become an important iron and steel industry. Furnaces existed also at Londonderry, and at Bridgeville, Nova Scotia, although the results of their operations were not at all encouraging. The rolling-mill and finishing industry was so widely developed in Ontario, Quebec, and the Maritime Provinces, that a redundant supply of certain kinds of plants seems actually to have existed.

[1] *Iron Age*, vol. LIII, p. 460.

This development of the Canadian iron and steel industry demands some explanation, and explanations are not difficult to find. At Radnor and at Drummondville, the character of the ore and the consequent quality of the iron assured a ready market for the product. When this iron could find a market in England and the United States the conditions of production must have been very favorable. Likewise, the developments at New Glasgow and Trenton were favored by the discovery and use of the Newfoundland ores as early as 1894. It is doubtful whether the production of pig iron at Trenton would have succeeded had it not been for the Newfoundland ores, since the Pictou ores were soon found to be unsatisfactory and their supply was limited. Developments at Hamilton, Ontario, were similar. While the company originally intended to use Ontario ores in order to benefit by the Ontario bounty system, it was found necessary to use Lake Superior ores which could be laid down at Hamilton almost as cheaply as at American furnaces. On the other hand, the depletion of ore deposits at St. Maurice, and the hardness of the ores at Londonderry, were conditions that ended the operations of the St. Maurice Forges and made the production of pig iron at Londonderry barely profitable. Thus we see that in this period of the history of the industry, the supplies of ore were at some points more favorable than they had been.

The fuel supply was also a matter of importance. Fuel could be laid down at Hamilton almost as cheaply as at American Lake ports, and at New Glasgow there was a fairly satisfactory supply of good coking coal. Charcoal was abundant at Radnor after depots were arranged for the accumulation of both ore and charcoal. At Drummondville there was plenty of good wood for charcoal. Elsewhere conditions were not so favorable. The Londonderry firm had to shut down on one occasion when the only coke plant in Nova Scotia failed to send a supply. Finally,

it had to build its own coke ovens. The end of operations at St. Maurice was also hastened by the lack of an adequate supply of charcoal.

Meanwhile, too, the market for pig iron and steel billets had grown. The Canadian consumption of pig iron advanced, from an average of 75,000 tons for the years 1880 to 1885, to an average annual consumption of 106,555 tons for the years 1890 to 1895.[1] This was not so large as it might have been had the rolling mills not made considerable use of scrap iron in the production of bars and finished products. The consumption of much pig iron at Hamilton and within a radius of one hundred miles suggested the initial attempts of the Hamilton Blast Furnace Company. The company also used a great deal of iron in its own mills. While the ordinary product of the Pictou Charcoal Iron Furnace failed to secure a favorable reception, the special quality of charcoal iron produced at Radnor and at Drummondville was always in demand for the manufacture of car wheels in this period of rapid railway expansion. Not only was the integration of the different branches of the New Glasgow industries a source of special strength, by making them almost self-sufficing, but their highly finished products found a ready market. The Londonderry plant found advantage in extending its finishing industries to insure an outlet for its primary products which did not have as good an open market. The integration of the various plants of the McDougalls and the Drummonds, of Montreal, rendered these enterprises more complete than they would otherwise have been, and put them on a better plane of competition. While one branch of the industry supplied pig iron, another finished the raw material into articles ready for an extensive and growing market.

By 1877 steel had begun to take the place of puddled bars in the manufacture of finished products. The total world product advanced from 569,618 tons in 1877 to

[1] See Appendix B, Table I.

7,155,957 tons in 1897.[1] Unquestionably, this had much to do with the construction of steel mills, and the practical abandonment of puddling furnaces.

The supply or lack of capital often spelled success or failure in the Canadian iron and steel industry. At this time more domestic capital had been accumulated and was available for investment. Probably the development of the corporate form of business organization was also significant. At all events, one of the most noticeable facts was that plants previously owned and operated by partnerships were in the later eighties taken over by joint-stock companies, and whenever new lines of development at New Glasgow were entered upon, a new company was formed, even though the interests were usually so nearly identical that an amalgamation was formed as soon as the new enterprise had proved its worth. In many cases new capital was subscribed and extensions were made to the plant whenever incorporation was effected. Fresh ventures almost always made use of the corporate form of organization.

As we have seen, the most rapid growth of the industry was realized in the finishing stages. This can be at least partially explained by the increase of railway mileage from 6858 miles in 1879, to 10,773 miles in 1885, and to 16,550 miles in 1897.[2] The facility with which corporations could be formed doubtless aided the growth of the finishing industry. The most significant fact, however, seems to be that this branch of the industry could be conducted on a relatively small scale, in small local factories, to supply a local market with commodities on which transportation charges might be high. A small building could be turned into a nail factory, or rolling-mill proprietors could add a department for the production of horseshoes or tacks. It is for this reason largely that a considerable addition to the

[1] W. Harper, *Charts of the Commerce of the World*, p. 83.
[2] See Appendix A.

number of rolling mills may be noted for the years of prosperity 1880 to 1883 and 1887 to 1890.

§ 8. It is more difficult to determine the exact effect of the tariff and bounty system on the development of the iron and steel industry, during this period, than it was to determine the value of protection in the previous period. Discussion, of which there was much more than during the earlier period, shows that opinion as to the effects of protection varied. Yet most of those who favored protection were usually content with proving that the industry had grown up during a period of high duties. As we have seen, such an argument is not conclusive. Those who wanted protection should have been able to prove the connection between protection and the development of the industry and should have been able to show that the benefits did not exceed the burden of the protective policy.

Evidence of the stimulus afforded by protection appears, however, in several cases. The Annapolis Iron Company put its furnaces in operation at Londonderry, following the granting of bounties on puddled bars and the increase of the duties on scrap iron. The Hamilton Blast Furnace Company was, no doubt, encouraged by the generosity of Hamilton and by the bounty law and the scrap iron duty of 1894. Protection seems to have been most effective in developing the finishing industry. In fact, the protection afforded was so high that the production of some lines was overstimulated to an extent necessitating the formation of combines to maintain prices behind the tariff wall. The growth of the finishing industry was partly due to causes other than protection. Yet protection, by increasing prices, encouraged the erection of small plants. At the same time the fact that pig iron and especially scrap iron could be secured cheaply within the country or could be imported at low prices favored the growth of the rolling-mill industry by providing cheap raw materials.

In most cases, however, protection had little to do with the development of the primary industry. The St. Maurice Forges failed in 1883, the year that bounties were granted the "struggling industry." The Steel Company of Canada was in liquidation soon after the first increase in protection. Likewise the bounties on puddled bars and the duty on scrap iron entirely failed to support the Pictou Charcoal Iron Company. The Hamilton Blast Furnace Company succeeded without the use of the bounties it had expected on the production of iron from Ontario ores. The production of steel began in 1882, long before bounties were given, and was continued with success despite the fact that the duty of $3 per ton, provided for in 1879, was abolished in 1881. New pig-iron furnaces were built at Radnor and at New Glasgow five years after the revision of 1887 and before the scrap-iron duty was raised in 1894. The Drummondville furnaces were built in 1880 and 1881 before bounties were added to the duty of $2 per ton. As there was a foreign market for the product of the car-wheel plant, these furnaces would have been built whether or not protection had increased in 1879. In short, practically all the successful pig-iron and steel plants were started because of fundamental technical conditions that favored their development rather than because of the application of the national policy of protection to the iron and steel industry.

Having determined the part played by protection in the development, we may turn our attention to the wisdom of the policy. In the first place, neither the duties nor bounties were responsible for any great part of the growth of the primary industry. In the mean time the duties on pig iron must have cost consumers about $3,000,000 on a total consumption of 1,500,000 tons. Of this, the home producers must have received about $1,000,000, enough to build a very respectable blast furnace capable of producing the total amount of pig iron imported. This $1,000,000, plus

the additional $3,000,000 paid by consumers, and over $600,000 paid as bounties, could have been used in a more remunerative way, possibly by the Government itself, in building its own furnaces and mills for the production of iron for government railways and other government works. The protection of the primary industry was, therefore, a mistake.

It seems strange that the duties on pig iron and scrap iron were not entirely abolished in favor of bounties on pig iron alone. The payment of bounties of $4 per ton would have cost the Government only $1,200,000, and would have cost consumers practically nothing. However, political parties, like electorates, have the liberty of making errors in judgment: it is easier to see a mistake thirty years later with the figures before us than to foresee and avoid it. But by 1893 the Liberal Party saw the force of this argument in tariff policy, and shaped its political platform accordingly.

At the same time a good deal can be said for the application of protection to the finishing industry. As we have seen, protection undoubtedly had a stimulating effect. Whether the cost was too great or not is difficult to determine. Certainly large volumes of iron and steel goods were imported under the duties. In the case of some products competition became so severe that prices fell, and for the time being the duties were not so great a burden on consumers as they might have been. Once the industry was developed, protection should have practically been abolished; the revision of 1894 did effect some slight reduction on finished iron goods. The growth of the finishing industry would have warranted more extensive reductions than were made at that time. Many manufacturers and others using iron and steel goods were of this opinion, and accordingly gave their approval to the policy of "tariff for revenue only" launched by the Liberals at the Ottawa Convention of 1893.

§ 9. In conclusion, it may be said that, while there was some advance in the Canadian iron and steel industry between 1879 and 1897, the industry was not a large one. As protection apparently was not an important factor in the development of the primary industry, the burdens of protection lead us to believe that it was a mistake. Protection did have a considerable influence in developing the production of finished products, but it was not reduced as rapidly as it should have been, and injustices and inequalities in the customs tariff led to much criticism and opposition. So when the Conservative Party lost power in 1896, Canada entered on a new period of commercial policy and of economic history which will be the subject for discussion in Part Four of this study.

PART FOUR

THE CANADIAN IRON AND STEEL INDUSTRY 1897–1914

CHAPTER VII

THE GENERAL HISTORY OF THE TARIFF AND BOUNTY SYSTEM

§ 1. NINE years after the advance in customs duties in 1887, the protective policy was again the subject of sharp controversy, and the political situation was acute. The Liberal programme, of "tariff for revenue only," included not only a reduction of duties on iron and steel, but also the abolition of the bounty system. At the same time much dissatisfaction with and criticism of the Conservative Government was abroad. The period from 1893 to 1897 was one of severe industrial depression and of general discontent. The country sought relief at the hands of a new Government, and in 1896, placed the control in the hands of the Liberal Party.

By far the most difficult task for the revisers of the tariff in 1897 was the alteration of the schedule comprising iron and steel and the leading intermediate and finished products. It is always difficult to frame an iron and steel schedule that will suit all parties for any length of time; even within the industry, dissension is sure to arise. Probably no other schedule of Canadian duties has given occasion for so much discussion among manufacturers or so much difficulty in politics.

The farmers especially expected to have a great burden lifted from their shoulders. They expected to get many iron and steel articles at prices materially lower as a result of the reduction of the duties which had protected the successive stages of manufacture. On the other hand, the producers of pig iron, steel billets, and puddled bars wanted high protective duties continued along with the bounties.

While the foundrymen were not quite so united, most of them favored a reduction of duties on their raw materials. Manufacturers who used castings as raw material were quite decided in their demand that there should be a reduction of protection to producers of castings. The manufacturers of bar iron, who were complaining of the duty on pig iron, puddled bars, and on wrought scrap iron, were specially grieved by the advance of duties on scrap iron in 1894. Likewise, the manufacturers who used bar iron and steel in the production of finished articles objected to the high duties on their raw materials. Each stage of the industry was quite willing to accept protection for itself, insisting at the same time on cheap raw materials for the production of its own output. It is probable that the general dissatisfaction on the question of iron and steel duties secured for the Liberals the support not only of the farming element, but in even greater degree of the great body of manufacturers themselves, to whom the prospect of decreased duties on articles which formed their raw materials appealed as an obvious desideratum, and contributed more than any other factor to the defeat of the Conservatives in 1896.

§ 2. So far as the iron and steel duties were concerned, the tariff of 1897 provided a general reduction.[1] On pig iron, kentledge, and cast scrap iron, a reduction of $1.50 was made and the duty placed at $2.50 per ton. The duty on iron and steel ingots, cogged ingots, blooms, slabs, billets, puddled bars, loops, etc., n.o.p. (not otherwise provided for), was reduced from $5 to $2 per ton. Iron and steel scrap were admitted at $1.50 instead of $3 per ton; the duties on steel bars, bands, plates, and steel angles were reduced from $10 to $7; on steel fish- and tie-plates from $10 to $8; and the duties on steel shaftings and forgings were placed at 30 per cent, with a minimum of $10

[1] See Appendix F.

per ton, instead of 35 per cent, with a minimum of $15 per ton. On plates not less than one quarter of an inch thick, tubing for boilers, angle ties, beams, etc., over 35 pounds per lineal yard, the reduction was 2½ per cent. The duty of 30 per cent on iron and steel bars and rails was reduced by applying it to all rails weighing as much as 45 pounds, instead of 35 pounds per yard. The duty on bituminous coal was reduced from 60 cents to 20 cents per ton on slack coal, and to 53 cents on "run-of-mine" coal. Iron and steel for certain uses — for instance, iron and steel masts, beams for composite ships, iron and steel products which at the time of importation were of a kind not made in Canada and were imported for use on ships; steel rails weighing not less than 45 pounds per yard for use on public railways, but not including electric railways or tramways — were entered free. Many other forms of iron and steel of special grades, sizes, and characteristics were entered free when used for special purposes. Wire rods were also admitted free of duty.[1] On the primary products in general, the reduction varied from 35 to 75 per cent of the previous duty; on the more finished products it averaged about 2½ per cent, or about 12 to 20 per cent of the previous duty. This revision of 1897 was framed on the principle of making as many concessions as possible to every one. For instance, since puddled bars were not extensively produced, the duty was reduced.[2] The duty on bridge plates was reduced on the general principle of making iron and steel products, especially raw materials, cheaper.[3] Barbed wire and galvanized fencing were placed on the free list January 1, 1897,[4] as a concession to the farmers. The labor unions were pacified by the prohibition of the importation of the products of convict labor, and by provisions for detailed inspection to prevent the importation of such con-

[1] 60–61 Vic., 1897, chap. 16.
[2] *Debates*, 1897, p. 3637.
[3] *Ibid.*, p. 3592.
[4] 60–61 Vic., 1897, chap. 16, sec. 262.

victt-made goods.[1] Reductions on primary products, of course, pleased the manufacturers of finished products. The free entry of raw materials for manufacture is undoubtedly a corollary of a "national policy," a splendid arrangement for the manufacturers, in so far as they use such raw materials, and probably a benefit to the country as a whole, to the extent by which the prices on finished products may be thus reduced.

§ 3. This arrangement of concessions to all cannot be fully understood without a consideration of the bounty policy involved in the revision of 1897, and continued by the bounty acts of 1897 and 1899. As there were only four iron and steel plants on the bounty list in 1897, the Liberal Government probably could have ended the bounty system without a great dislocation of industry[2] by simply leaving it to expire. But territorial elements in politics, especially the interests of the Maritime Provinces, as well as internal difficulties with the schedule previously considered, forced the retention of the bounty system. When the general duties on iron and steel were reduced by the first Fielding Budget, the bounties were retained and their scope extended to make amends for this reduction and to equalize conditions for the iron and steel manufacturers.[3]

In so doing the scope of the bounty system was enormously enlarged.[4] On pig iron the bounty was increased from $2 to $3 per ton when made from native ore, and a bounty of $2 per ton was given on iron made from imported ore. The bounty on puddled bars and on steel billets and ingots was raised from $2 to $3. Whereas up to this time only pig iron, steel billets, and puddled bars had received bounties, under the law of 1897 bounties became payable on steel ingots also, when manufactured in Can-

[1] *Debates*, 1897, pp. 3661–62.
[2] E. Porritt, *Iron and Steel Bounties in Canada*, pp. 201–02.
[3] *Debates*, 1897, p. 5186.
[4] See Appendix D.

ada from components of which not less than 50 per cent weight consisted of pig iron made in Canada.[1] All bounties were to be payable on all iron and steel made in Canada between April 23, 1897, and April 23, 1902.[2]

Besides extending the payment of bounties for a period of five years, advancing the rate of bounty, and extending the system to steel as well as iron, the scope of the bounty system was considerably enlarged by the inclusion of iron and steel produced in Canada from foreign ore. Bounties on such products were made payable in proportion to the kinds of ore used. It may be explained that in 1896 the newly discovered bed of ore at Bell Island, Newfoundland, was under the control of the Nova Scotia Steel Company,[3] and the Hamilton Furnace was beginning to use American in preference to Canadian ore. The claim that the clause giving a bounty on iron produced from foreign ore was framed in the interests of these companies is justified. When some argued that bounties should be given on iron made from native ores only,[4] it was pointed out in reply that the duty on iron had been reduced and that this arrangement simply balanced the reduction. Of course, the Canadian Government maintained that it objected to the subsidizing of American ore, but it believed there were reasons for stimulating the development of the sister colony of Newfoundland.[5] Indeed, it even hoped to draw Newfoundland into the union.[6] Mr. Fielding, the Finance Minister, further argued that a bounty on iron produced from foreign ore would create a market for native ore,[7] since it was impossible to smelt Canadian ores without adding some foreign ores. Mr. Fielding believed that the difference in the bounties on iron produced from foreign ore and iron produced from native ore was sufficient to

[1] 60–61 Vic., 1897, chap. 6.
[2] 60–61 Vic., 1897, chap. 11.
[3] E. Porritt, *Iron and Steel Bounties in Canada*, pp. 204–05.
[4] *Debates*, July, 1899, p. 7637.
[5] McGrath, *op cit.*, p. 384.
[6] *Debates*, 1899, p. 7641.
[7] *Ibid.*, p. 7643.

stimulate Canadian mining, even though the United States mines were rather well developed. But some feared,[1] though without much cause, that American ore alone would be used.[2] At all events, though foreign ore probably would have been used even without the bounties, the clause permitted the Canadian manufacturer to use foreign ore freely. This was a valuable concession to the producers, inasmuch as the Nova Scotia companies were already using Newfoundland ore, and the Hamilton Furnace, Lake Superior ores.[3] Mr. Fielding, however, was opposed to admitting even Newfoundland ore to the full bounty lest this should involve too high a charge on the Treasury.[4]

The Fielding Bill, as first presented, provided that bounties should be paid only on iron and steel used in Canada. In the event of shipment outside of Canada, the Governor-General was to be empowered to impose an export duty equal to the sum paid in bounties on such shipments.[5] This resolution was supported on the ground that otherwise the bounty system would attack foreign iron and steel industries, and, at the same time, would involve the taxation of the home consumer for the benefit of foreign consumers: in short, it would attack foreign production and subsidize foreign consumption.[6] Mr. Fielding claimed, with some foresight, that the United States and Great Britain would object and that the hostility of other countries might be aroused.[7]

It has been charged that Mr. Fielding's clause was inserted in favor of domestic manufacturers of finished products, who wished, if possible, to benefit from the bounties paid the pig-iron producer. If no bounty was paid on exports, the producers of pig iron would be confined to a limited home market where they would sell more cheaply

[1] *Debates*, pp. 7642–43.
[2] See Appendix B, Table I.
[3] *Iron Age*, vol. LX, September 23, p. 13.
[4] *Debates*, 1899, p. 7642.
[5] *Ibid.*, 1897, pp. 1129–30.
[6] E. Porritt, *Iron and Steel Bounties in Canada*, pp. 221–22.
[7] *Debates*, 1896, p. 5196.

than otherwise. The producers of the finished products hoped to gain, not only from reduction of the duties on pig iron, bar iron, and steel, but also by the grant of bounties.[1]

Mr. Foster objected in the interest of Canadian labor and industrial development. He argued that the charcoal iron produced in Quebec was used largely in the States.[2] It would be a difficult matter to know before production whether pig iron would be sold at home or abroad, and hence the production of pig iron would be an indefinite gamble.[3] Mr. Foster hoped that bounties would put the product in the world market, and by encouraging a large output, make production profitable at lower costs and a lower margin of profit. After all, it was a bounty on production, not on exportation or consumption.[4] By the final draft of the bill, bounties were made payable on all production whether consumed in Canada or exported abroad.[5]

To some the revision of the tariff and bounty laws was a disappointment. Farmers, especially, had hoped for a greater reduction, but Mr. Fielding calmly explained that as the United States Government, by passing the Dingley Tariff, registered its opposition to concessions, the Canadian Government had been forced to modify its policy. It also seemed advisable to go slow in the introduction of changes lest industry be too much deranged. Official responsibility had taken the edge off the enthusiasm for a "tariff for revenue only." In presenting the schedule, Mr. Fielding called attention to the vested rights of the iron and steel industry and suggested that the industry was well worth encouraging on a large scale. He claimed that the bounties would be automatically reduced. Even though they should be large, there would be a compensatory return in the development of industry and the consequent increase of customs duties at ports where the iron and steel

[1] *Iron Age*, vol. LIX, May 20, p. 12.
[2] *Debates*, 1897, p. 5188.
[3] *Ibid.*, 1897, p. 5193.
[4] *Ibid.*, pp. 5189–91.
[5] 60–61 Vic., 1897, chap. 6.

industry flourished.[1] It is to be questioned whether the Liberal Party had really intended at the last moment to make such sweeping changes as the election platform promised. One may be excused for the suspicion that some arrangement or understanding had been arrived at between the Liberals and the interested manufacturers before the election.

Altogether, the arrangement was a clever political solution of a very difficult political and industrial problem. By "Liberalizing" the bounties to cover the product made from imported as well as domestic ore, and by increases on the product of domestic ore, the furnace-men were compensated for the reduction of the duty on pig iron and on scrap iron and steel. The reduction on bar iron was acceptable to the manufacturers and consumers of finished products alike. The reduction of the duty on puddled bar, pig iron, and scrap iron tended to balance matters for the bar-iron men. Protection naturally had to be diminished on pig iron, the first of the series of products, before relief could be given farther up the scale. Probably no better scheme could have been devised to accomplish so many different objects. The adjustment was a nice balancing of warring interests; and mine-owners, smelters, rolling-mill owners, manufacturers using iron and steel, and consumers alike were apparently satisfied, and certainly temporarily silenced.[2]

§ 4. One might have expected that legislation in respect to iron and steel would have ended here. But suddenly a new actor, the Dominion Iron and Steel Company, appeared on the stage. The Nova Scotia Steel Company, which had been using with fair success a mixture of Newfoundland and Pictou County ores at Ferrona, was contemplating extensions at Sydney Mines, Cape Breton.

[1] E. Porritt, *Iron and Steel Bounties in Canada*, pp. 216–17.
[2] *Iron Age*, vol. LXII, August 4, p. 55.

The Rathburn interests of Deseronto, Ontario, were making charcoal iron, the Hamilton Company was contemplating extensions, and the Canada Iron Furnace Company was building at Midland. But above all, the Dominion Coal Company interests were considering the establishment of works at Sydney, Cape Breton, and were prepared to build provided the bounties were assured for a certain period.[1] By 1898 the control of one half to two thirds of the ore deposit at Bell Island had passed into the hands of a Boston promoter and other persons connected with the Dominion Coal Company, and even at this time preliminaries had been begun for the organization and promotion of the Dominion Iron and Steel Company.[2] This Whitney Syndicate, as it was called before obtaining its charter, made overtures to the Laurier Government for an extension of the period of bounty payments.[3] Moreover, the Nova Scotia Steel Company had refused to build at North Sydney unless the Government would give assurance of continuance of bounties after 1902.[4]

Thus it was that, in 1899, the Bounty Act [5] was amended by adding to the Act of 1897 a provision that the bounties should be continued from 1902 to 1907 on a decreasing scale. The rates set forth in the 1897 schedule were to decrease as follows: for the period from April 23, 1902, to June 30, 1903, 90 per cent of the previous bounties; 1904, 75 per cent; 1905, 55 per cent; 1906, 35 per cent; and 1907, 25 per cent. Mr. Fielding explained that the object of this extension was to give the industry a reasonable measure of encouragement especially as considerable development was expected [6] as a result of the bounty law. Moreover, the establishment of a successful iron industry assists the development of many other industries.[7] For instance, Mr.

[1] *Debates*, 1899, pp. 4971–73.
[2] E. Porritt, *Iron and Steel Bounties in Canada*, p. 204.
[3] Jeans, *op. cit.*, p. 53. [4] *Iron Age*, vol. LXI, June 30, p. 4.
[5] 62–63 Vic., 1899, chap. 8; see Appendix D.
[6] *Debates*, 1899, p. 4967. [7] *Ibid.*, pp. 4971–73.

Fielding hoped for the development of shipbuilding in Canada.[1] The Government also wished to give the Dominion Iron and Steel Company the assurance that bounties would be forthcoming for at least five years after the first blast furnace at Sydney could be put on the bounty list at Ottawa.[2] While this act was passed three years before the expiration of the Act of 1897, it was an advantage that the bounties were assured for eight years — the longest period for which bounties ever had been provided in advance.[3]

This act had the further advantage of providing a means of gradually letting the industry stand unaided. Some objected to the bounty system altogether; others preferred to make it a permanent part of the fiscal system, but the Government struck the happy medium. Having found a bounty system in operation, it was ready to continue it for a time in order that the industries growing up should get firmly established and be able to stand alone within a reasonable time.[4] Although Mr. Whitney had asked for the maximum bounties for five years, the graduated scale was deemed sufficient for the purpose.[5] The Conservatives, too, were favorable. Mr. Tupper even wanted the bounty on iron made from Canadian ore applied to all iron made from British North American ore, so that the Newfoundland iron deposits might aid the development of the Canadian iron industry.[6]

In 1901 and 1902 the amount of bounties paid was the subject of considerable discussion. The prospectus of the Dominion Iron and Steel Company was quoted to show that large payments were expected. Other important companies were being formed, and it was feared that the payments would become unduly heavy as the companies grew. An establishment like that of the Dominion Iron and Steel Company, with a capital of $25,000,000, could

[1] *Debates*, 1899, p. 4974.
[2] E. Porritt, *The Revolt in Canada*, p. 117.
[3] *Debates*, 1899, p. 4974.
[4] *Ibid.*, p. 4977.
[5] *Ibid.*, pp. 4971–73.
[6] *Ibid.*, p. 4976.

hardly be called a struggling infant.[1] Mr. Fielding answered this criticism with his well-known argument that the development of the industry would result in such a growth of trade and prosperity for the country that there would be no loss to the Government.[2]

§ 5. Difficulties with the iron and steel schedule seemed never to end. This was a time of depression in the United States and, therefore, for the Canadian iron industry. The American Steel and Wire Company had control of the Canadian wire market, especially the market for barbed wire, and numbers 9, 12, and 13 galvanized wire, which had come into Canada free since 1897. This branch of the United States Steel Corporation was a great enemy to the Canadian industry, so much so that some Canadian factories had completely given up manufacturing these varieties.[3] It was even proved that the sale of practically all wire in Canada was temporarily under the control of the American trust.[4] Until 1903 the Dominion Iron and Steel Company had not secured a firm hold on the market[5] for iron and steel, yet it was at this time that the sliding scale of bounties took effect.

It was pointed out that the tariff and bounty system was not keeping up with the industry. Rails and structural forms were now being manufactured, and should have assistance in one form or another. The Dominion Iron and Steel Company was ready to produce wire rods. Though the manufacturers of steel billets and ingots were receiving a bounty of $2 per ton, manufacturers of structural steel received nothing.[6] While structural steel weighing less than 35 pounds per yard paid a duty of $7 per ton, that weighing more was being admitted free of duty. This discrimination was said actually to discourage the produc-

[1] *Debates*, 1901, p. 1170.
[2] *Ibid.*, 1901, p. 1171.
[3] *Ibid.*, 1903, p. 7953.
[4] *Ibid.*, p. 7935.
[5] *Ibid.*, p. 7977.
[6] *Industrial Canada*, vol. II, p. 321.

tion of heavier sections.[1] The tariff and bounties of 1897 protected the Nova Scotia Steel Company's products, but no provision had been made for those of the Dominion Iron and Steel Company. The latter could not produce the protected products because the market was too small for both companies.[2] Thus, the bounty and tariff system was assisting the production of only certain products and the work of only special companies.

The manufacturers were not entirely in favor of the bounty system. They pointed out that the duties on nearly all articles were considerably lower than those imposed by the United States,[3] even though the United States market was very large and the industry well developed.[4] After getting the different manufacturers to concur in the proposals for protecting the different grades of raw materials, the Canadian Manufacturers' Association presented a tariff in 1903 framed on the basis of the United States tariff. They asked for the following advance of duties: on pig iron, from $2.50 a ton to $3; steel rails, from $7 to $8; steel billets from $2 to $4; structural steel, $7 for all sizes up to 45 pounds per yard as opposed to the former limit of 35 pounds per yard; and on wire rods, which were free, a duty of $6 per ton was asked.[5] In 1903, Mr. Borden, the leader of the Opposition, introduced a resolution in favor of increased protection to the iron and steel industry in the form of higher duties on finished articles largely imported.[6]

The question of a readjustment of iron duties was, however, a delicate matter. Many changes are necessary if one item is touched. A commotion is started among the manufacturing interests every time the schedule is revised. It is difficult to harmonize all the warring interests.[7] The

[1] *Monetary Times*, vol. XXXVII, p. 580.
[2] *Debates*, 1903, p. 4291.
[3] *Industrial Canada*, vol. III, p. 524.
[4] *Debates*, 1903, p. 4270.
[5] *Iron Age*, vol. LXX, March 19, p. 23.
[6] *Debates*, 1903, p. 3864.
[7] *Iron Age*, vol. LXXI, January 15, p. 22.

Government hesitated to impose duties on wire rods used for making wire fencing for the farmers. Cheap iron for Canada was as necessary as cheap food for Great Britain. A high tariff on certain iron products which could not be cheaply produced would destroy the balance of the iron schedule. Certainly it had injured the Conservative Party in 1894. For these reasons the tariff proposed by the Canadian Manufacturers' Association was not accepted and the Borden Resolution was rejected as quite inopportune.[1]

But some answer had to be given to the various demands, industrial and political. Hence it was that the bounty system came in for revision again. The law of 1899 was so amended as to provide that the decline of bounties should be delayed by one year, although the bounties by a different system of gradation were still to disappear in 1907. At the same time, the bounties were extended to a new line of finished products, especially those which were about to be made, and which were the subject of most discussion by the Canadian Manufacturers' Association. On articles produced from steel manufactured in Canada from components of which not less than 50 per cent of weight consisted of pig iron made in Canada, the bounties were to be as follows: on rolled round wire rods,[2] $6 per ton; on structural material,[3] and rolled shapes[4] and plates,[5] $3 per ton. The producer was required to furnish satisfactory

[1] *Debates*, 1903, p. 4341.

[2] Less than three quarters of an inch in diameter, when sold to wire manufacturers for use in making wire in their own factories in Canada.

[3] Rolled angles, ties, channels, beams, joists, girders, or bridge-building or structural sections.

[4] Not round, oval, square, or flat, weighing not less than 35 pounds per yard, and also on flat-eye bar blanks, when sold for consumption in Canada.

[5] Not less than 30 inches in width and not less than one quarter of an inch thick, when sold for consumption in Canada for manufacturing purposes for which such plates are usually required, not including plates to be sheared into plates of less width.

proof that the articles were produced in Canada and sold to Canadian consumers.[1]

Opinions on the new arrangement varied. Most manufacturers began to feel that bounties could not be piled up without provoking public disapproval. The more successful the system, the larger the sums the Treasury would have to pay out. There was no disguising this form of expenditure, especially as, after 1900, it had been charged to capital account. Of course, the burden would fall largely on the general public who would contribute to the revenues chiefly by paying duties on imports of a different character. As bounties came manifestly from the people, they were likely to be unpopular.[2]

Mr. G. E. Drummond, of the Canadian Manufacturers' Association, believed that the bounties of 1903 would be a very valuable aid because they dealt with goods about to be manufactured. Since bounties on finished products give a motive to carry production beyond the primary stage, he expected that rolling mills would be hurried to completion.[3] Mr. Drummond, however, would have preferred protective duties.

Even if the revision of 1903 was not entirely satisfactory, the Algoma Steel Company, which had recently begun to make steel rails, decided to make the most of it. By taking advantage of the faulty wording of the law, they claimed bounties for steel rails under the term "other rolled, not round, shapes." An account for $60,000, on steel rails bought by the Government itself, was handed in. The claim was disputed by the Government and the Auditor-General refused to pay it.[4] In 1905 the Government passed an Order-in-Council providing that the bounty hitherto paid on steel rails should no longer be paid. It held that the original reason for granting the bounty was the encouragement of the manufacture of structural steel for

[1] 3 Ed. VII, 1903, chap. 68.
[2] *Iron Age*, vol. LXXII, July 16, p. 18.
[3] *Ibid.*, July 23, p. 11.
[4] *Ibid.*, vol. LXXV, p. 636.

bridge-making and other purposes.[1] A duty of $7 per ton had already been provided for steel rails.[2]

§ 6. The next important revision came in 1906. For several years the Government had been pressed to revise the tariff, but it had hesitated in favor of tariff stability. In 1905 a tariff commission was appointed, and meetings, at which the iron and steel interests adequately presented their case, were held throughout the country. A company, established at Morrisburg to manufacture tin plate, asked for protection. It claimed that it had started the mill in expectation of either bounties or protection, neither of which had been granted. The farmers were objecting to any extension of the bounties on any iron and steel branch, and the tinware manufacturers in Toronto and the canning factories of Ontario, British Columbia, and Nova Scotia objected to new duties on their raw materials. Consumers declared that Canada was not ready for the establishment of a tin-plate industry. The demand, at reasonable prices, was not sufficient to justify the operation of a plant on a scale large enough to make the industry profitable.[3]

While the producers of primary products asked for increased duties, the rolling-mill deputation protested against any increase. They held that the duties on billets and other articles should be left as before, inasmuch as it was impossible to get adequate supplies of all grades of iron and steel in Canada.[4] The Dominion Iron and Steel Company asked for special protection against the United States Steel Corporation in respect to wire rods, but wire-makers claimed that if duties were imposed on their raw material, some compensatory advantage should be given.[5] Makers of barbed and galvanized wire wanted a duty of 25 per cent in order to enable them to shake off the domi-

[1] *Canadian Annual Review*, 1905, p. 150.
[2] 3 Ed. VII, 1903, chap. 15.
[3] *Iron Age*, vol. LXXVII, p. 1658.
[4] *Ibid.*, p. 1632.
[5] *Canadian Annual Review*, 1905, p. 159.

nation of the United States Steel Corporation.[1] The cold-drawn steel plants of Hamilton asked for increased protection to compensate them for duties on their raw materials, and the cast-iron pipe men asked for protection against British dumping.[2] The Montreal Steel Company wanted higher duties on steel castings, railway switches, and frogs, to offset high duties on special grades of pig iron and coal.[3]

A proposal to abolish the duty of 53 cents per ton on coal for coking purposes was the occasion of considerable discussion. The Nova Scotia coal companies, of course, objected to the abolition of the duty.[4] The Ontario iron industry had to admit that the Nova Scotia iron industry was not handicapped by the duty on coal, for coal deposits were in close proximity to the furnaces and the Province granted a rebate of one half of the royalty of 12½ cents per ton on coal used in the manufacture of iron. Ontario, on the other hand, handicapped by dependence on Pennsylvania, demanded an equalization of conditions.[5] When the Algoma Steel Company declared that the location of its new coking plant on the Canadian side or at the American "Soo," depended on its use of free coal,[6] the Government decided to admit coal for the iron industry practically free of duty.[7]

In the new tariff, presented in 1906, an attempt was made to classify items as nearly as possible in groups, metals and manufacturers of metals making up Class 8. In this revision the iron and steel schedule was again the chief subject of alteration. Some changes were made in the working of the tariff. Lists of drawbacks and of prohibited goods were appended. A new "Intermediate Tariff," between the general and British preferential tariffs, was introduced as a bait to countries which would give as favor-

[1] *Iron Age*, vol. LXXVI, p. 503.
[2] *Ibid.*, pp. 572–73.
[3] *Ibid.*, p. 503.
[4] *Debates*, 1906–07, pp. 3771–72.
[5] *Iron Age*, vol. LXXVI, p. 600.
[6] *Ibid.*, vol. LXXV, p. 1145.
[7] Drawback of 99 per cent of the duty.

able conditions as those offered in such intermediate tariff. In order to simplify calculation, units of $2\frac{1}{2}$ per cent were adopted.

Altogether about 120 items were included in the iron and steel schedule. Not all items were changed and many changes were unimportant, since the demand for the goods was very small. As a concession to the Western farmers, there were slight decreases of about $2\frac{1}{2}$ per cent on some thirty classes of agricultural implements. Drawbacks of 95 to 99 per cent were given on certain kinds of iron and steel imported and used in the manufacture of certain articles exported from Canada. The bounties on angles, plates, and structural sections were abolished, and imports of those articles were subjected to a duty of $7 per ton in place of a duty of 10 per cent plus a bounty of $3 a ton. No duty was imposed on tin plate. Coal used for the production of coke used in smelting was practically exempted from duty by provision for a drawback of 99 per cent of the duty paid.[1]

§ 7. The revision of 1906, like that of 1897, cannot be fully understood without some knowledge of the discussion centering around the bounties. In the previous session, Mr. Conmee, of Thunder Bay district, had introduced a bill to revise the bounties on iron and steel and to make a greater distinction between the use of foreign and of domestic ore. He hoped for a great development of the iron deposits of Canada, especially in the Thunder Bay district. He claimed that no one would contend that Canada as a nation should continue to pay bounties on iron made from ore from any foreign country, when she has within her own borders abundant ore of good quality. He pointed out that the bounties had developed the industry, but largely on a basis of foreign ore. He urged that the bounties were so small in 1906 (55 per cent of the 1902 scale) that Cana-

[1] 6–7 Ed. VII, 1906–07, chap. 11.

dian ore had little advantage, especially as iron ore entered Canada free of duty,[1] and as the dumping clause did not, therefore, apply.[2] Why should Canadian industry be dependent on foreign raw materials? Mr. Conmee believed that the development of Canadian ores and mines would be a wise precaution against any possible disturbance of international traffic and the consequent closing of Canadian furnaces.[3]

The Government took the view that to keep Canadian smelters going with American or Newfoundland ore and to develop the industry with Canadian labor and capital would be more important than to mine Canadian iron ores. The time will come when Canada will need her own ores. Mines do not last forever.[4] The Dominion Iron and Steel Company argued that it was reasonable to pay bounties on the product of foreign ore in order to maintain and stimulate the industry until Canadian mines could be developed, especially as it was necessary to import some ore to mix with the native supplies.[5] It urged the renewal of bounty legislation, on the ground that the time required to establish the Sydney industry had been much prolonged by delays and difficulties. The company was not in the assured position which it had expected to reach before the expiration of the bounties; moreover, for this very reason, the Government had not been called upon to pay as much as had been expected at the outset.[6]

Mr. Fielding had advocated that, in 1907, the bounties should be abolished, and the duties further reduced.[7] Yet Mr. Conmee and the iron and steel interests, who appeared before the Tariff Commission, seem to have succeeded in presenting a satisfactory case, and in 1906 the bounty system was reinstated for another four years. Bounties

[1] *Debates*, 1906, pp. 3749–50. [2] *Ibid.*, p. 3754.
[3] *Ibid.*, p. 3755. [4] *Ibid.*, p. 3776. [5] *Ibid.*, pp. 3769–71.
[6] E. Porritt, *Iron and Steel Bounties in Canada*, p. 128.
[7] *Debates*, 1899, p. 4970.

were made payable on pig iron made in Canada from Canadian and from foreign ore; on puddled iron bars made in Canada from pig iron made in Canada; on steel manufactured from ingredients of which not less than 50 per cent of weight consists of pig iron made in Canada; on rolled round wire rods; and also on pig iron made in Canada from Canadian ore by process of electric smelting, and on steel manufactured in Canada by electric process direct from pig iron manufactured by electricity in Canada from Canadian ore during the calendar years as follows: —

Year (calendar)	Pig iron manufactured			Steel			
	From Canadian ore	From foreign ore	By electric process	Puddled iron bars	Wire rods	Ordinary	M'f'd by electric process
1907	$2.10	$1.10		$1.65	$6.00	$1.65	
1908	2.10	1.10		1.65	6.00	1.65	
1909	1.70	.70	$2.10	1.05	6.00	1.05	$1.65
1910	.90	.40	2.10	.60	6.00	.60	1.65
1911			1.05				1.05
1912			.65				.65

It was further provided that the bounty on pig iron might be paid on molten iron used in the manufacture of steel by the direct electric process, the weight of such iron to be ascertained from the weight of the steel so manufactured.[1]

Thus, a nice discrimination was made in favor of the Canadian ore, while the current rate on iron produced from foreign ore, on puddled bars, and on steel, was simply extended at a declining rate until 1910. In view of the fact that it requires two years to establish such smelting furnaces,[2] the rates of iron and steel made by electric process were to apply from December 31, 1908, to December 31, 1912. As we have already seen, the bounties on structural sections, plates, etc., were abolished in favor of customs duties.

[1] 7 Ed. VII, 1907, chap. 24. [2] *Debates*, 1906–07, p. 7454.

This act, unlike the Act of 1897, did not provide for the payment of bounties on iron and steel exported from Canada. As Mr. Fielding had foreseen, the Secretary of the United States Treasury, on complaint of American producers, was threatening to impose countervailing duties on Canadian iron and steel.[1] British iron-makers had also been protesting. Indeed, international complications or tariff wars were imminent.[2] Pig iron of varying amounts had been exported to the United States and elsewhere continually after 1897; $55,448 in 1896, $149,000 in 1899, $778,619 in 1902, and $22,284 in 1905.[3] Countervailing duties would have completely excluded such goods from the United States. Besides, with the occasional large exports, the force of the old argument that bounties on exports would help maintain prices in Canada may easily be seen. That the consumers of pig iron would urge their old objection against bounties which might provoke countervailing duties on finished, as well as primary, products entering the United States, was a foregone conclusion. Furthermore, it was noised abroad that the United States Steel Corporation would build in Canada in order to secure the benefit of the bounties.[4] The act, therefore, provided that bounties should be paid on pig iron, bars, and steel, only when manufactured in Canada for consumption therein; further, that no bounty should be paid on steel ingots from which steel blooms and billets for exportation from Canada were manufactured, except that no prohibition was made of payment of bounties on exports of iron and steel manufactured by electric process.[5] The Customs Act Amendment of that year (1907) made further provision that every person who desired to export any such articles, subject to a bounty when used for home consump-

[1] *Iron Age*, vol. LXXII, p. 4.
[2] *Ibid.*, vol. LXXXII, p. 1081.
[3] See Appendix F.
[4] E. Porritt, *Iron and Steel Bounties in Canada*, pp. 220–21.
[5] 7 Ed. VII, 1907, chap. 24.

tion, but not for exportation, should file with the nearest Collector of Customs a written application for permission to export and a declaration that the bounty had not been paid, that it would not be claimed, or that, if paid, the sum had been refunded to the Government.[1]

Various farming and grain-growing interests, in sixty-five petitions against the renewal of the bounties, insisted that the industry had reached a stage where it could stand on its own feet.[2] In a caucus of the Liberal Party, some stood by the farming interests by asking for an abandonment of the bounty on pig iron made from imported ore, but this suggestion was opposed by Nova Scotia interests.[3] The Opposition even insinuated that the chief beneficiary of the bounty system, the Dominion Iron and Steel Company, was located in Nova Scotia, the Province of which Mr. Fielding was the political leader.[4]

In reply, Mr. Fielding argued that it was as proper to pay bounties in 1907 as in 1887.[5] If bounty legislation was not adopted, then customs duties would have to be increased all round or else the industry would fail and disappear. As wire rods, on which bounties had been paid since 1904, were not finished articles, the Government refused to impose a duty that would necessitate changes of duties on other articles made from iron and steel.[6]

To some objection raised against the expenditure involved, Mr. Fielding replied that the Treasury had not and would not lose a cent on the payment of bounties. He had always claimed that the iron and steel industries established in the country had developed trade a long distance from the plants, for not only had the trade centers of Canada sold to these industrial centers, but above all, millions had been paid into the Treasury at the various ports

[1] Customs Act Amendment Act, 1907.
[2] E. Porritt, *The Revolt in Canada*, p. 134.
[3] *Iron Age*, vol. LXXIX, p. 428.
[4] E. Porritt, *Sixty Years of Protection in Canada*, p. 454.
[5] *Debates*, 1906–07, p. 4961. [6] *Ibid.*, pp. 311–12.

(much by the iron and steel companies themselves) that had been developed by the growth of the iron and steel industry. The "Soo," Sydney, North Sydney, Sydney Mines, Glace Bay, and New Glasgow were small centers before the development of the industry, and the growth of Hamilton had undoubtedly been greatly advanced by the presence of the iron and steel industry. He estimated, therefore, that the increase of customs duties at such ports had almost fully reimbursed the Treasury, and, certainly, if like supplies entered at St. John, Halifax, Toronto, Montreal, and Quebec be counted, it might be considered that every dollar had been returned to the Government.[1] This argument has been Mr. Fielding's chief defense of the bounty system at various periods of criticism throughout the Liberal régime. There is no doubt whatever that the customs receipts at such places have greatly increased during the past fifteen years. Between 1897 and 1901 they increased by $1,711,815 per year, whereas only $1,247,341 was paid as bounties.[2] Between 1900 and 1909, the increase amounted to over $9,000,000, principally due to the development of the iron and steel industry.[3] About $11,000,000 was paid in bounties during that period.[4]

Unfortunately, Mr. Fielding overlooked the consideration of one very simple but frequently neglected fact; namely, that a large part of the industry had been developed by conditions quite independent of the bounty system. Just in so far as the industry would have been, or has been, developed for other reasons, the bounties paid represent a direct expenditure of the Federal Government, uncompensated by an increase of the duties collected, because they would have been paid to the Treasury whether or not the bounty system had existed. What part of the industry would have been developed without the bounties may be determined later. In the mean time, it is

[1] *Debates*, 1906–07, p. 3762. [2] *Industrial Canada*, vol. IV, p. 65.
[3] *Canadian Mining Journal*, vol. XXXI, p. 208. [4] See Appendix E.

important to notice the Minister's uncritically accepted assumption.

§ 8. One might almost think that the Liberal Government had developed a habit of renewing the bounty system; certainly it had set several precedents. Furthermore, the loss of Liberal seats in the election of 1908 was an item in favor of retention of the bounties.[1] The iron and steel interests were favoring an extension to cover steel shipbuilding.[2] They also held that 1910 was a bad year in which to remove the bounties, since the German Surtax had but recently been abolished. The amount of imports from Great Britain and the possible concessions to the United States were other unfavorable factors.[3]

Since the iron and steel industry had always been the Liberal pet, the Government would probably have renewed the bounties or given protection but for the vigorous and organized opposition of the farmers, the dumping of rails in England, India, and Australia, and the spread of the combination movement.[4] By the spring of 1910 it was agreed that no bounties should be renewed and that those on wire rods should not be paid after June 30, 1911.[5]

The ending of the bounty system was sad news to the manufacturers of iron and steel, who wanted to have the bounties on wire rods renewed for at least a year, but the political tour of Sir Wilfrid Laurier, Mr. Fielding, and other prominent members of the Government through western Canada in the summer of 1910 convinced them that their decision had been politically sound. The infection of Reciprocity resolutions and agreements gave proposals for the continuation of the bounties a final deathblow, so far as the Liberal Party was concerned.

[1] *Iron Age*, vol. LXXXII, p. 1994.
[2] *Ibid.*, vol. LXXXV, p. 266.
[3] *Ibid.*, vol. LXXXII, p. 524.
[4] *Nation*, vol. XCI, pp. 257–58.
[5] *Debates*, 1910, p. 8363.

§ 9. Probably no other piece of Canadian commercial legislation was ever accepted with so little criticism as the bounty system, as applied to iron and steel. Almost all interests have lauded this general system as a desirable and constructive policy, a distinct encouragement to the recipients, and a benefit to the consumers of iron and steel products. Parliamentary discussion centered about details alone. Even the Conservative Opposition was favorable. Sir Charles Tupper wanted to have Newfoundland ore treated as native ore. George Foster, the leader of protectionists, welcomed Mr. Fielding into the fold. The farmers, usually unorganized, were not taken seriously.

Now that the history of the bounty system has been recorded, it is in place to estimate the value and wisdom of the scheme. This is not an easy task, and the most that can be done at this point is to discuss the merits of bounties as opposed to duties. If protection had not been afforded in the form of tariff duties and bounties, — that is, if bounties alone or protective duties alone had been granted, — the issue would have been clear; and whatever system existed could have been freely discussed on its own merits. But ever since the introduction of the bounty system in 1883, the problem has never been so simple. It is quite impossible to discuss the bounty system apart from a consideration of the duties, or the tariff system apart from the bounties, — at least, so far as the wisdom of adopting a protective policy is concerned.

It is obvious that granting bounties is a practice pertaining to the protective policy, and no one who favors the bounty system can hide beneath the free-trade mantle. The fundamental purpose of a bounty system and of protective duties is identical; namely, the temporary or permanent assistance of an industry under alleged and possibly actual disadvantages. Whether or not such a policy in any form has been justified by Canadian experience is a consideration which must be postponed, pending a more

detailed discussion of the development of the Canadian industry.

In the mean time, let us assume, for convenience, that a protective policy was necessary in Canada for reasons political or economic, whether from the point of view of pure expediency or fundamental economic causes. This has been the assumption on which have proceeded both the Conservative Party and, with qualifications, the Liberal Party in Canada. Meanwhile, our immediate problem is that of determining the relative merits of duties and bounties as a protective system.

Both parties, as we have seen, were confronted with most embarrassing internal difficulties in the iron and steel schedule. The nature of that situation scarcely need be repeated. It was on these rocks that the Conservative Party found itself stranded in 1896, and the Liberal Party very shortly after found the way out beset with serious dangers. And yet the channel had been traversed before. The pilots had been disqualified by the election of 1896, but the beacon lights were set to guide the returning Liberal Party, which had not been in power since 1878. Thus it was that when it seemed desirable on all scores to reduce the protection afforded by tariff duties, the actual amount of protection was but slightly reduced owing to the extension of the bounty system in 1897.

Just as it was a mistake for the Conservative Party to raise the duty on scrap iron in 1894, so, too, it would have been a political blunder had the Liberals failed to reduce the duties on iron and steel in 1897. The manufacturers, always a strong and influential political body, were clamoring for lower duties on pig iron, and steel billets, as well as on scrap iron. Likewise, the duties on finished products had to be slightly reduced if the farming interests were to be satisfied. Thus, political necessity as well as economic convictions favored the downward revision of the customs tariff. On the other hand, the iron and steel interests,

which had suffered, had to be compensated if no interest was to be alienated from the Liberal Party. Economically, the movement was quite sound so far as the internal arrangements of a protective system were concerned. One argument in particular favors the bounty form of protection. As we have seen, Canada has been and is a large consumer of iron and steel goods. Between 1897 and 1911, the annual consumption of pig iron had increased from 62,194 tons to 878,093 tons. In 1908, a year of depression, and in 1910, the consumption exceeded 900,000 tons. In the calendar year 1912, the total Canadian production alone exceeded 1,000,000 tons.[1] The consumption of steel, which is being used in the manufacture of an increasing number of products, has no doubt increased even more rapidly, especially in recent years. The rapid expansion of Canadian farming interests has given rise to an enormous demand for wire fencing, dependent on wire rods. Likewise, the extension of railway mileage has involved a large demand for bridge-building and railway supplies. Finally, the use of structural steel for building purposes is an important source of the demand for the products of iron and steel.

Had customs duties instead of bounties been granted, the prices of such iron and steel products would naturally have been raised to some degree. The extent to which the benefit of the duties could have been used would have varied from time to time according to the conditions of the market at home and abroad. The piling up of stocks in the hands of United States producers has nearly always disorganized the Canadian market because of the possible or actual dumping of such surplus stocks. And yet the enactment of high customs duties would ordinarily have raised prices above the American scale, at times to the full extent of the duty. The rapid increase in the demand for, and the consequent increase in the prices of, iron and steel from 1897

[1] See Appendix B, Table I.

to 1902 would doubtless have aided the Canadian producers to the extent of the increase in prices, plus the Canadian duty. As a matter of fact, it was just this advance in prices in spite of the lack of duties that was one of the more favorable conditions for the development of the Canadian industry between 1896 and 1902.

If Canada had been a large exporter of iron and steel, the result might have been otherwise, but when a nation becomes an importer, or so long as a country imports articles whether or not they are produced at home, the tendency is for the importing country to pay duties in the form of higher prices. The exporter pays the duty only to the extent that producers belonging to the importing nation meet the foreign price, plus the freight rates, and other incidental charges. Ordinarily, as we shall see, Canadian producers have not been able to supply the total Canadian demand at such prices, and the existence of the Canadian duties would, therefore, have been a great burden on the Canadian consumers of the various iron and steel products, especially pig iron and steel billets.

Bounties, on the other hand, subsidize the home producers, and offset a part of the costs of production. Consequently goods can be sold at prices that might not otherwise be profitable. Foreign goods are admitted free of duty or at lower rates than would otherwise have been necessary, much to the advantage of the consumer. Producers benefit according as they are able to retain the bounties and yet compete with foreign producers. Home production is thus made possible without an increase in the price of the product to the manufacturing consumer.

Under a system of duties the consumer is presumed to pay the increase of prices on all the goods consumed; under a bounty system the consumer pays only the bounties on that part of the goods produced within the country. The consumers of other imported and dutiable goods may pay the bounties and the consumer of bountied iron and steel

products may get off, for the greater part, unburdened. In such circumstances, a bounty system is obviously preferable to the imposition of so-called "adequate" customs duties.

Another advantage in the bounty system is the fact that, strangely enough, it digs its own grave, while the recipients of the bounties are content to have the system buried. A bounty system that is successful (in so far as the development of an industry may be taken as a mark of success) necessitates the expenditure of a direct outlay from the Treasury, and although Mr. Fielding was able to convince the iron and steel interests, including the manufacturing consumers of iron and steel, that the bounties had been entirely repaid by an increase in the collection of duties directly resulting from the development of the iron and steel industry, he found it increasingly difficult to persuade the general public of this fact. Here was a plausible excuse for the payment of bounties amounting to only $610,607 from 1883 to 1895, but between 1895 and 1913, $16,785,827[1] was paid: enough to build an iron and steel plant that would produce an output probably as large as that of the Dominion Steel Corporation, and far more than enough to produce all the Government purchases of iron and steel products for railway and other purposes. Such an expenditure cannot fail to excite the critical observation and discussion of those who do not favor a protective policy.

Besides, the bounty system was admittedly a policy of expediency, temporarily adopted and subject to a decline of rates. Thus, the Canadian system was finally allowed to pass away between 1910 and 1912, at a time when public discussion seemed especially unfavorable to a renewal.

§ 10. The tariff bargain of 1906 represented a downward revision with the exception of duties on angles, tees, etc. The farmers were disappointed that the tariff had

[1] See Appendix E.

not been further reduced, yet they felt that they had probably come out on the right side of the bargain. Manufacturing interests, hoping for higher protection, were even more critical, and from 1906 to the present time have made recurring requests for higher duties on several iron and steel products. But few changes have been made. In 1907 and 1910 Mr. Fielding said that the tariff was working well, and that nothing would be done.[1] In 1911, the agreement resulting from negotiations for reciprocity with the United States included the admission of wire rods free of duty. While rods were at that time on the free list, the iron and steel interests nevertheless objected to the inclusion of wire rods. Such a treaty would have made the increase of duties favoring this branch of the industry practically impossible. Consequently the iron and steel people threw their influence in favor of the Conservatives who opposed the agreement.

Encouraged by the results of the election of 1911, which placed in power the traditionally high-protective Conservative Party, the iron and steel people immediately pressed for an advance in duties on certain iron and steel goods. A memorial, presented to the new Finance Minister, Mr. W. T. White, in 1912, failed, however, to move him from Mr. Fielding's policy of tariff stability. The years 1912 to 1914 brought with them extraordinary conditions. As the United States iron and steel industry had been in a state of depression, wire rods were being sold in Canada at a price below the average cost of production in Canada. Meanwhile the Dominion Steel Corporation had invested about $1,000,000 in a rod mill capable of producing about 100,000 tons a year, and the Steel Company of Canada had built a $750,000 mill capable of producing about 75,000 tons a year. While both of these mills have been only partially operated, 92,000 tons of the annual consumption of 150,000 to 200,000 tons of wire rods were imported into

[1] *Iron Age*, vol. LXXXIII, p. 481.

Canada in 1913. Consequently the two companies renewed their appeals for tariff revision, finally with success.

Small makers of nails in Canada objected to the advance of duties on wire rods, their raw materials. Of the Canadian production of nails (approximately 1,500,000 kegs per annum) about 17 per cent is produced by the Dominion Steel Corporation and its ally, the Pender Company of St. John; 52 per cent by the Steel Company of Canada; and about 30 per cent by the smaller independent nail-makers in Canada. The smaller firms justly fear that the price of their raw material will be advanced by the larger companies; there is no doubt of this, or what would be the advantage of the duties to the producers of wire rods, which are used largely by the finishing mills of the large companies themselves?

The Government decided, however, that the desirability of favoring the production of wire rods outweighs the objections of the smaller nail-makers, especially as the nail-makers are protected by a duty of 35 per cent. Consequently, on April 6, 1914, the tariff was revised to provide for duties on wire rods as follows: $2.25 per ton under the British preference, and $3.50 under the intermediate and general tariffs. The duties on wire nails and on wire were not advanced.

A similar situation arose in another direction. The Algoma Steel Corporation at Sault Ste. Marie, made representations that if the same duties were imposed on merchant mill products weighing over 35 pounds per yard, as on those weighing less, the company would be able to obtain capital for the erection of mills capable of producing products of a weight of 120 pounds per lineal yard. The tariff was, accordingly, revised to provide for a duty of $4.25 under the preference, $6 under the intermediate tariff, and $7 under the general tariff on rolled iron and steel and angles, beams, etc., weighing less than 120 pounds per yard. This item in the tariff is thus supposed to be

modernized, in line with the general Canadian tariff policy of moderate protection.[1]

Such were the conditions and features of the chief changes in 1914. These alterations cover the items around which the greater part of the discussion has centered in recent years. Apparently the chief requests of the iron and steel people have been met. It is difficult, however, to predict the future course of events. The iron and steel interests, encouraged by this success, will probably ask for an advance of duties on the primary products, pig iron and steel billets. Mr. White has declared himself against high duties on these articles, the raw materials of such a variety of industries; especially as an advance would necessitate an increase of duties on nearly all products into which they enter as raw material.

[1] *Debates*, 1914, pp. 2546–48; and *Memorandum of Department of Customs*, April 7, 1914.

CHAPTER VIII

VARIOUS FEATURES OF TARIFF AND BOUNTY LEGISLATION

§ 1. In 1896 the Liberals promised that if they were placed in power duties would be reduced. The general reduction on most articles in that year amounted to about 10 per cent of the duties in force before 1896. On a few articles the reduction of duties was greater; as much as 40 per cent on pig iron, 60 per cent on steel billets and ingots, and 75 per cent on wrought scrap iron and steel. Since bounties were granted as temporary compensation to the producers of these articles on which the important reductions were made, the producers were, for the time being, in about the same situation as before the revision.

A new kind of reduction was adopted in 1896 in the form of the British preference. Under the Imperial Acts that applied previous to 1847, goods from the United Kingdom or other British possessions were admitted free of duty; and after the repeal of the Imperial Act, some of the Provinces admitted British goods at specially favorable rates; but this preferential principle had long since disappeared from Canadian tariff-making. When the tariff was revised in 1896, and the preference introduced, it was hailed as an entirely new invention, much to the credit of the Liberal Party, and particularly, of Mr. Fielding, the Finance Minister.

This preference section provided that when the customs tariff of any country admitted the products of Canada on terms as favorable on the whole as those of the Canadian reciprocal tariff [1] articles, the growth, produce, or manu-

[1] Set forth in Schedule D of the Customs Tariff Act.

facture of such country, when imported direct, might enter Canada at reduced rates. Schedule D provided that on such goods the duties should be, on and after April 23, 1897, until June 30, 1898, seven eighths of the duty mentioned in Schedule A, and on and after July 1, 1898, three quarters of the duty mentioned in Schedule A.[1] This applied particularly to the products of Great Britain. In 1898 it was explicitly provided that the articles of *certain* countries, especially the United Kingdom, Bermuda, the British West Indies, and British Guiana, when imported direct, should be entered at three quarters of the duties mentioned in Schedule A, provided that the articles admitted were *bona fide* manufactures of such country.[2] In 1900 the preference was raised to one third of the duties set forth in Schedule A.[3]

In 1906 the British preference was made even more explicit, inasmuch as definite rates of duty were imposed on individual articles. In the adoption of multiples of $2\frac{1}{2}$ per cent, as 15, $17\frac{1}{2}$, or 20 per cent, the lower rate was always taken. If, for instance, the $33\frac{1}{3}$ per cent reduction provided for a duty between 15 and $17\frac{1}{2}$ per cent, the article was taxed 15 per cent. Thus, the revision of 1907 tended to favor the British exporter even more than before. To be admitted under this tariff, it was also provided that a substantial part of the value of the manufactured article must have been produced by labor in one or more of the above-mentioned countries.[4]

Many have claimed that the value of the preference to British manufacturers has been small. The duties on iron and steel, especially on the primary products, on which bounties have been paid, were greatly reduced in 1896, and the actual preference was not very great, since the preferential rates were estimated on the basis of the low rates in the general tariff. Of course there can be no preference on free goods. One third of $2.50 for pig iron, or $2 for

[1] 60–61 Vic., 1897, chap. 16.
[2] 61 Vic., 1897, chap. 37.
[3] 63–64 Vic., 1899, chap. 15.
[4] 6–7 Ed. VII, 1906–07, chap. 11.

steel billets, is a small preference. Under existing circumstances British manufacturers have been unable to grasp the surplus Canadian market because they have been greatly hampered by American competition. In spite of this, many Canadian manufacturers claim that the British preference rates are an insufficient [1] protection and are anxious to have the preference abolished.[2]

It was hoped that the preference would stimulate importation from Great Britain, or that British merchants would be able to get and keep a larger share of the trade supplied by Canada's imports, especially imports of iron and steel. Imports of dutiable iron and steel goods averaged slightly over $3,000,000 from Great Britain and about $3,300,000 from the United States for the years 1876 to 1880. In the later eighties annual imports from Great Britain exceeded those from the United States by about $200,000, but the first seven years of the nineties saw a rapid advance in the excess of imports from the United States over those from Great Britain, resulting largely from a decline in the imports from Great Britain, although partly from an increase in imports from the United States.

The preference was expected to change this situation, but it failed to accomplish its purpose. For the period 1895 to 1899 imports of dutiable iron and steel goods from Great Britain averaged annually about $2,100,000, as compared with an average of $8,000,000 from the United States. Dutiable imports from the United States exceeded those from Great Britain by about $11,000,000 in 1899. Since 1899, when the preference was increased, the excess of dutiable goods from the United States has increased regularly. The British proportion of total imports of dutiable goods decreased, from an average of about 18 per cent for the years 1899 to 1910, to 12 per cent for the period 1911 to 1913.[3]

[1] *Monetary Times*, vol. XL, p. 840. [2] *Iron Age*, vol. LXX, p. 20.
[3] See Appendix G, Table II.

It is more difficult to determine what part of the imports from Great Britain would have been impossible without the preference. The greater part of the British imports is composed of free goods, and those articles on which the general duties are low and on which bounties have been paid. On the average about half of the free goods have come from Great Britain. Whereas, in 1913, one tenth of the dutiable goods came from Great Britain, nearly one third of the free goods were of British origin. Pig iron, on which the preference is only $1 per ton, has been imported from England in values amounting to $376,313 in 1909, and $2,032,608 in 1908, as compared with imports of $491,529 and $1,429,946 from the United States for the same years. Pig iron, which makes good ballast for transatlantic ships, can be carried at very low rates. The next largest item is galvanized iron sheets, on which the preference is 5 per cent. Imports to the value of $1,389,343 were received in 1912. Iron and steel rails, on which the preference amounts to $2.50 per ton, have not been largely imported from Great Britain.[1] Yet, Mr. James Farrell, president of the United States Steel Corporation, claims that the preference cuts well into the profits on rails sold in Canada.[2]

Imports from the United States have taken the form of bar iron and steel, angles, beams, rails, skelp iron and steel, plates, and wire: — articles on which the duties are relatively high and the preference large. The actual amount of importation depends in part on the character of the articles and the freight charges paid on them. Since structural material, rails, etc., can be carried cheaply by rail, American producers secure the larger part of the trade. Specialization in certain branches has undoubtedly favored the importation of many American iron and steel products.

While the American industry has prospered and devel-

[1] *Canada Year-Book*, 1912, p. 183.
[2] *Monetary Times*, vol. LI, p. 534.

oped during the last twenty years, Great Britain has been trying to learn the cause of her loss of supremacy. Both the United States and Germany lead Great Britain in the production of pig iron. The United States leads the world in plant organization and in the use of machinery on a large scale. Consequently, the preference has been less valuable to the British producer than it might have been had British superiority in iron and steel production continued down to date.

The value of the preference to Canadian consumers of iron and steel is a different, yet related, question. British iron goods that do not compete with either American or Canadian made goods (a very small volume) may cost the consumer less than they would otherwise. Even if the British producer is in a strategic position, he can afford to sell a larger quantity of goods at a somewhat lower price. The preference on goods that must compete with Canadian or American products is more apt to be effective. In such cases as these, much depends on the standing of the British producer. If he is as efficient as his competitors elsewhere, he will export to Canada at a price lower than the Canadian consumer would otherwise have to pay, and the consumer will benefit to the extent of the preference on his total consumption. If the preference simply neutralizes British disadvantages, the British producer will absorb the preference to such extent as he can gain the Canadian market. The Canadian consumer does not gain in situations like these and the Canadian or American producer loses that portion of the market that the British producers are able to seize. The Canadian consumer benefits not so much from the actual amount of British goods imported as by the fact that the possibility of obtaining a supply in Great Britain forces domestic and American producers to reduce prices to meet the possible or actual importation of British goods under the preference. Actual importation of a considerable value of British goods is evidence that

the force of competition is in operation. In no case can the preference increase the cost of iron and steel goods to consumers. The Canadian producer loses in so far as he fails to hold the Canadian market, and he loses still more when the sale price to the consumer is reduced. The consumer gains, not only on British imports, but also on domestic and other foreign products.

§ 2. The internal difficulties with the iron and steel schedule were really at the basis of the revisions of 1897 and 1907, especially that of 1897. It is just this feature in the protective system that gives most difficulty, and in some cases secures the support of manufacturing interests for what may appear to be a downward revision of the tariff. Indeed, the addition to the free list of articles not produced in the country may be regarded as a logical feature of the protective system. In a scheme of this kind, however, the protective system could not be logically worked out in all its phases; since the entry of the raw materials of certain manufacturing interests free of duty is a contradiction of the principle of encouraging infant industries.

At all events, the principle of admitting the raw materials of certain manufactures at low rates of duty has been fully worked out in Canada since 1896. This appeared in the revision of 1897 in the form of the reduction of the rates of duty on pig iron and steel, the raw materials of a large body of manufacturing interests; and also in the admission of certain articles free of duty, when used in Canadian factories in the manufacture of certain products. In a more special form, the principle was embodied in what has been called the drawback system, by which duties on specified commodities imported and used in the manufacture of certain articles were almost wholly rebated to the importer of such raw materials.

In 1907 rolled iron and steel and pig iron, when used in

the manufacture of agricultural implements to be exported from Canada; steel under one-half inch in diameter or under one-half inch square, when used in the manufacture of locks and knobs; steel, cut to shape, when used in the manufacture of spoons; flat spring steel, steel billets, and steel axle bars used in the manufacture of springs and axles, other than for railway and tramway vehicles; spiral spring steel used in the manufacture of railway spiral springs; steel used in the manufacture of cutlery, files, augers, bits, braces, hammers, axes, hatchets, scythes, reaping hooks, hoes, hay and straw knives, agricultural forks, rakes, skates, stove trimmings, bicycle chains, and windmills; rolled angles of iron and steel of specified size used in the manufacture of bedsteads, lap-welded tubing, and bituminous coal imported by proprietors of smelting works and converted into coke for the smelting of ores, were given drawbacks of 99 per cent of the duty paid.[1] In 1914 the Conservative Government provided for a drawback of 99 per cent of the duty on wire rods to be used in the manufacture of galvanized iron and steel wire, numbers 9, 12, and 13, and on charcoal for use in smelting metals.[2]

It has generally been argued that these rebates are detrimental to the Canadian iron industry, especially in times of depression. Canadian material cannot be used unless it is marketed at rates low enough to meet foreign competitors in the open market.[3] A claim has been made that scores of orders for Canadian iron were canceled in 1906,[4] and that these rebates accounted for a good share of the imports of iron and steel products.[5] The iron and steel men held that 15 to 20 per cent of the iron and steel products would be displaced by American and British iron.[6]

[1] 6–7 Ed. VII, 1906–07, chap. 11, Schedule B.

[2] *Canadian Mining Review*, vol. XLV, 1893, p. 4.

[3] Department of Customs, Memorandum, *Tariff Changes in Effect*, April 7, 1914.

[4] *Iron Age*, vol. LXXVIII, p. 1632.

[5] *Hardware and Metal*, vol. XXII, Jan. 8, p. 29.

[6] *Iron Age*, vol. LXXVIII, p. 1632.

An interesting feature appeared in 1900 when the American iron tubing firms were dumping their surplus product into Canada. Imports from the States had been heavy for some time and low prices prevailed. The Canadian producers solved the difficulty by buying up the pipe offered at sacrifice prices, by turning a different thread on American pipes, and by exporting the piping to Great Britain. Thus, the 99 per cent drawback on the exported product was earned, and at the same time a nice profit was made on the British sales, and the price in the home market maintained.[1]

The discussion of this drawback system is interesting and important. A memorial presented by the Canadian iron and steel interests in November, 1911, to Mr. White, the Minister of Finance, contains the following statements in respect to imports for the fiscal year ending March 31, 1911: "Of imports of pig iron amounting to 270,102 tons valued at $3,613,931, 151,349 tons valued at $2,084,729, came from the United States. It is estimated that nearly one half of the quantity imported from the United States was used in the manufacture of articles, which under Schedule B of the Customs Tariff, obtained a rebate of 99 per cent of the duty." "Of imports of bar iron or steel amounting to 104,895 tons, valued at $3,179,921, 84,650 tons valued at $2,533,747 came from the United States, quite one half of which, having been used in the manufacture of articles named in Schedule B, obtained a rebate of 99 per cent of the duty." [2] These statements were the basis of a very definite claim for higher duties. The drawbacks were discussed again in 1913. It has been claimed that the exporting manufacturers find it impracticable to keep foreign and domestic pig iron separate, so only foreign pig iron is used in the article exported, and domestic pig iron in the article for home consumption. A manufacturer of agricultural implements might import 10,000 tons of pig iron and use 20,000 tons of domestic iron. On exporting

[1] *Iron Age*, vol. LXVI, Dec. 27, p. 15. [2] See Appendix J.

10,000 tons of implements, he would receive a drawback of the duty on one third of the 10,000 tons imported, instead of all the duty, as was intended. Consequently, the manufacturers have got into the habit of buying nearly all their pig iron abroad, and the pig iron industry has suffered. For this reason, the wording of the Customs Act has been changed to provide that drawbacks shall be payable on all pig iron, imported and used by the manufacturer in the production of certain goods, in the proportion of the amount exported to the total amount produced.[1]

Canadian iron and steel interests can hardly object to this form of tariff reduction. When the manufacturers of agricultural implements have to bear the burden of most of the adverse criticism of protection in order that other manufacturers may retain their protection, it is only fair that they should be able to secure their raw materials as cheaply as possible. The iron and steel industry was favored by the same principle in 1907 when coal employed for making coke to be used for smelting ores was admitted to the 99 per cent rebate list. Manufacturers would have us believe that the basis on which to judge the tariff policy of a country is the interest of each particular group. But commercial policies are not so simple. The drawback system is only additional evidence of the difficulties that arise from the necessarily illogical application of the protective principle. The revision of 1914 has, however, given the Canadian producers of pig iron a better opportunity to share in the Canadian market.

§ 3. If tariff reductions, the British preference, and the drawback system did represent a loss to the producers of primary products, measures other than Federal offered some compensation. For instance, in 1895, municipal bonuses had been given in favor of the establishment of

[1] *Debates*, 1914, pp. 25, 46–50; Memorandum of Department of Customs, April 7.

the iron and steel plant at Hamilton. When, in 1900, the Canada Iron Furnace Company installed its furnace at Midland, the municipality gave a bonus of $50,000 and exemption from all but nominal municipal taxation.[1] In 1902 North Sydney offered the Nova Scotia Steel Company a bonus of $50,000 and exemption from local taxation for 20 years.[2] In 1906 Belleville attracted the ill-fated Abbot Iron Works by a liberal municipal subsidy. Sydney was considering in the same year a proposal to establish there an industry to manufacture bar steel, angle bars, etc. The town was requested to give a bonus of $50,000 in 4½ per cent, 30-year city bonds, a 20-year tax exemption, and water at a maximum rate of 3 cents per 1000 gallons. It offered $30,000 and a 20-year tax exemption. St. John offered $50,000, and a 20-year tax exemption, free water, free site, and a $25,000 subscription to capital, — and got the industry. Port Arthur is practically a partner of the Atikokan Iron Company, by virtue of stock subscriptions, bond purchases, guaranties, free site, and tax limitations.[3] The Dominion Iron and Steel Company received from Sydney adequate support in the form of bonuses, free site, and tax exemptions. In 1904 Collingwood gave as much as $60,000 to the Cramp Steel Company,[4] which subsequently failed.

This is, of course, simply a part of the general municipal subsidizing of industries, a prevalent evil among Canadian municipalities. The companies are aware of the situation and virtually hold up the towns and smaller cities for support, threatening otherwise to build at some rival city. The iron and steel industry has shared the fruits along with the rest. The policy has little or no direct influence in the development of industry. Even the location of an industry is frequently determined by quite different and more funda-

[1] E. Porritt, *The Revolt in Canada*, p. 116.
[2] *Monetary Times*, vol. xxxv, p. 842.
[3] *Iron Age*, vol. lxxviii, p. 1257.
[4] 4 Ed. VII, 1904, chap. 44.

mental considerations, such as the existence of transportation facilities and proximity to the market.

§ 4. The Provinces also have taken a hand in encouraging the development of the iron and steel industry. In 1897 Ontario passed an act to encourage the manufacture of railway iron and steel by providing that Ontario might deliver to the companies, in lieu of a cash subsidy, railway iron or steel manufactured in Ontario from iron ore of which two thirds had been obtained from Ontario mines. It was also provided that subsidies granted to certain railways should be subject to the further condition that the companies should so far as practicable construct, equip, and operate their lines of railway with railway supplies and rolling stock of Canadian manufacture, whenever such supplies could be procured as cheaply and upon as good terms in Canada as elsewhere.[1] Ontario's Iron Mining Fund was completely exhausted by 1904, and as no provision was made for its extension, it is now a thing of the past.[2] Ontario also passed laws providing that municipalities might subsidize iron and other smelting works, rolling mills, and ironworks within or adjacent to the limits of the municipality or exempt them from taxation for a period not longer than twenty years.[3] After the collapse of the Consolidated Lake Superior Company in 1903, the Ontario Government undertook to guarantee the payment of wages due the employees, including high-salaried officials. Payment was made from local banks under the guaranty of the Government, which held security for the repayment in an already earned but not conveyed land subsidy to the Algoma Central Railway, one of the subsidiaries.[4] In 1904 an act was passed to give a railway bonus to

[1] 60 Vic., 1897, chap. 40.
[2] Ontario, *Report of the Bureau of Mines*, 1908, p. 194.
[3] 63 Vic., 1899, chap. 33, sec. 44.
[4] *Canadian Annual Review*, 1904, p. 2689; 4 Ed. VII, 1904, chap. 191.

the Grand Trunk Pacific, if the rails used in the Ontario section were produced in Ontario, or, if they were not obtainable in Ontario, in some other Canadian Province.[1]

Nor was Nova Scotia less generous, especially in regard to the Dominion Iron and Steel Company. In 1899 the promoters of the company secured a charter by which the company was given the right of eminent domain, and given the power to pay dividends on preferred stock while the plant at Sydney was under construction, and it was freed from all provincial and county taxation. The law of Nova Scotia was relaxed to make it legal for non-British subjects to become directors. A law was passed to the effect that a director should not be disqualified from contracting with the company, so that the promoters of the Dominion Iron and Steel Company could make contracts with the Dominion Coal Company for its fuel; and finally, the city of Sydney was given power to grant a bonus and free the plant from municipal taxation.

In the same year the Mining Code was amended to provide that the royalty payable to the Provincial Treasury on all coal mined and used in the manufacture of iron and steel in Nova Scotia, or by steamers owned or chartered by the company for conveyance of ores or the products of the plant, should be $6\frac{1}{4}$ cents, instead of $12\frac{1}{2}$ cents, per ton, which was the royalty paid on coal mined for export or for other domestic purposes.

§ 5. The Federal Government, too, had recourse to other forms of assistance. In 1900 Mr. Clergue, of the Algoma Steel Company, urged on the Government an amendment of the Railway Code that would call for the use of equipment made in Canada on railways to which Dominion subsidies were paid.[2] As a result the Railway Act was amended

[1] 4 Ed. VII, 1904, chap. 18, secs. 5 and 9.

[2] *Montreal Star*, April 27, 1910; E. Porritt, *Sixty Years of Protection in Canada*, p. 399.

to the effect that when the Dominion subsidies were bestowed on a railway undertaking, the company should lay its road with new steel rails made in Canada, if the same were procurable upon terms as favorable as other rails.[1] This is a lenient regulation, but it represents the attitude of the Government toward the iron and steel industry. It has also been claimed that iron and steel shipped over the Intercolonial Railway,[2] has been charged specially low freight rates, and that the Government loses $1 on every ton of iron and steel shipped from Sydney to Montreal.[3]

§ 6. A still more extraordinary form of assistance was given in 1900. The Government felt restrained by its strong free-trade declarations from giving more protection in the form of duties. But one month before the election of 1900 the Government entered into a large contract with the Algoma Steel Company for 125,000 tons of first quality "nickel steel" rails, 25,000 to be taken yearly for five years. For the first year the price was to be fixed by the market price in England.

This "Clergue" contract was severely criticized by the Conservative Opposition. Since nickel steel rails were not made in England, regulation of the price according to the English market price meant nothing. It was pointed out that no tender was let for the contract, and that it was impossible to estimate actual market prices from journal prices.[4] Furthermore, the price might be fixed for one whole year, at a time when the price was high, and the market price might fall soon after, as it did in 1900, from $35 to $26 within six months.[5] The contract was not generally applicable to all iron and steel plants, so it did not foster the industry.[6] The government was already paying bounties of $3 a ton on steel and $3 a ton on pig iron. These

[1] 63–64 Vic., 1900, chap. 58.
[2] *Debates*, April 23, 1907.
[3] *Ibid.*, April 27, 1907.
[4] *Ibid.*, 1901, pp. 2719–21.
[5] *Ibid.*, p. 2740.
[6] *Ibid.*, p. 3571.

bounties, plus $7 a ton on steel rails, were no doubt a good basis on which to raise capital and capitalization.[1] In fact, Clergue did make use of the contract to help raise money.[2] Strangely enough, the contract did not explicitly provide for the manufacture of rails in Canada,[3] and it did not specify the quantity of nickel to be contained in the new nickel steel rails to be provided at such prices.[4]

In reply to these criticisms, Mr. Blair, Minister of Railways, told the House that the contract had been made to stimulate another stage in the manufacture of iron and steel. Considering the statistics of railway iron imports, he thought it well worth while to establish a rail industry in Canada.[5] He pointed out, in addition, that a domestic rail mill would provide for quick orders for rails, which otherwise would have to be purchased from abroad at producers' terms.[6] Mr. Blair did not doubt Mr. Clergue's ability to carry out the contract on time.[7] English quotations were taken for the price of rails because American quotations would otherwise be made to ruin the new Canadian firm, and Mr. Blair thought the industry should be assured that it need not face unfair and destructive competition.[8]

But it was June, 1904, before the rail mill was regularly in operation at Sault Ste. Marie, Ontario, and in the mean time, the Government was saved over $100,000 in 1901 owing to Clergue's inability to ship.[9] Hence the rail contract, while it did assist in the sky-rocket financing of the Consolidated Lake Superior Company, was no great burden to the Dominion.

§ 7. A more definite form of assistance was finally given the production of steel rails. In 1904 the steel rail mills of the Algoma Steel Company at the "Soo" and at Sydney

[1] *Debates*, 1901, p. 2721. [2] *Ibid.*, p. 3637. [3] *Ibid.*, p. 3588.
[4] *Ibid.*, pp. 2631–33. [5] *Ibid.*, p. 3795. [6] *Ibid.*, p. 3547.
[7] *Ibid.*, p. 3546. [8] *Ibid.*, p. 3546. [9] *Ibid.*, p. 3791.

were put in operation, and in the mean time agitation for some form of protection had been successful.

Some regarded the protection of the steel rail industry as almost a natural consequence of the liberal assistance given to the manufacture of primary products. It was held that as there was no special inducement to convert the raw material into finished products the manufacturers of steel billets were being forced to look elsewhere for a market. In this they had the assistance of the bounties, which were then paid on iron and steel, whether the products into which steel was manufactured were exported or consumed at home. Hence they sold steel billets in the United States, instead of making them into rails in Canada. At the same time Canada was importing all of her steel rails.[1]

One strong argument for protection lay in the fact that the United States Steel Corporation and German exporters were dumping steel rails in Canada. Mr. Clergue, of the Consolidated Lake Superior Company, maintained that the German market was protected by a duty of $6 to $7 per ton, and that the price in Germany was $30 to $32 per ton. The freight charges to Port Arthur were $6 per ton, and yet the Canadian Northern Railway had purchased rails laid down at Port Arthur for $27, at which figure Clergue could not produce. He said it was for this reason that the rail mills had been closed down in 1902 before they had really begun operations.[2]

Mr. Clergue claimed, too, that the railroads would not be injured by a duty, since they could haul their own rails when produced in Canada, and would be indirectly benefited by the industrial development, and the increase of population and traffic. Hence, they should not have objected to a reasonable duty on rails.[3] There is some truth in this view. Probably Canadian railways can bear the

[1] *Iron Age*, vol. LXX, Dec. 4, p. 30.
[2] *Canadian Annual Review*, 1902, p. 298.
[3] *Industrial Canada*, vol. V, p. 70.

burden of protection, without passing it on, better than any other interest in Canada, and the protection of iron and steel articles used by railways might be worthy of consideration. It is never a serious matter to tax such natural monopolies. The most difficult task is to get the legislation passed.

Finally, it was pointed out that there was scarcely another product into which Canadian steel was turned, on which tariff duties were not higher than those on steel rails, a fact which made the manufacture of other articles especially profitable. In addition, while electric railway rails and other rails weighing less than 45 pounds per yard were dutiable at 35 per cent, rails for steam railways were free. But since electric railway rails are heavier than 45 pounds per yard, this arrangement gave an opening for fraud in the importation of rails for use on street railways. The suggestion was that all rails be put on the list at $7 per ton.[1]

In anticipation of the operation of the rail mills at the "Soo" and at Sydney, Nova Scotia, an act was passed in October, 1903, giving the Governor-in-Council power to impose a duty of $7 a ton on steel rails, when it was satisfactorily shown that steel rails of best quality, suitable for use in Canadian railways, were being made in Canada in sufficient quantity to meet the ordinary requirements of the market.[2]

This was a disappointment in that it left the industry apparently unprotected at its most critical moment; that is, before the whole market could be supplied. It was feared that, uncertain of securing the duty, the manufacturers might consider it less risky to continue selling billets than to make them into rails, especially when at that time billets had the bounty even when exported.[3]

For a year after this law had been passed not a single

[1] *Industrial Canada*, vol. II, p. 321. [2] 3 Ed. VII, 1903, chap. 15.
[3] *Iron Age*, vol. LXXI, April 29, p. 22.

rail was made in Canada. The difficulties of construction work at Sydney were great, and financial conditions at the "Soo" were adverse.[1] Nevertheless, on August 27, 1904, prior to the election, the Government passed an Order-in-Council declaring that the duty should go into effect providing that shipments, made before August 28, passed through the customs, and laid before February 28, 1905, should not be dutiable.[2] Rails bought by the Government were at that time free from duty, but in 1906–07, provision was made that Government purchases should no longer be exempt.[3]

The chief objection to this duty has come, of course, from the railways. In general, it may be said that the construction of railways has been of such paramount importance that it should not have been restricted by the backwardness of any particular industry. The Canadian Northern had given Mr. Clergue a 10,000 ton order for rails even before the duty was imposed, but 2500 tons had been delivered in an unsatisfactory condition, and the order had to be placed elsewhere.[4] To impose a duty on steel rails when the Canadian Pacific was expanding its system, the Grand Trunk issuing new securities, and the Grand Trunk Pacific and Canadian Northern projecting transcontinental railways was a policy the wisdom of which was doubtful.[5]

Since 1904 the railways have been opposed to the duties, pointing out that in periods of depression the steel companies have been able to keep the market, and that in periods of active railway-building there is no adequate supply in Canada. At no time previous to 1907, when the open-hearth and Bessemer converter capacity of the two plants at Sault Ste. Marie and Sydney was increased, did the output of the two mills satisfy the demand. Yet within

[1] *Iron Age*, vol. LXXIII, May 26, p. 14.
[2] *Ibid.*, vol. LXXIV, Oct. 27, p. 38.
[3] 6–7 Ed. VII, 1906, chap. 11.
[4] *Iron Age*, vol. LXXIII, Jan. 18, p. 15.
[5] *Ibid.*, vol. LXXI, April 16, p. 34.

a month after the mills began work the Government was satisfied that steel rails were being made in sufficient quantity to meet the requirements of the market, and an Order-in-Council put the steel-rail duty into operation.[1] Since 1908 the annual production has averaged about 350,000 tons, worth about $10,000,000.[2] Steel rails are still imported, nevertheless, in amounts varying from $750,000 to $1,500,000 annually.[3]

The actual policy in respect to steel rails has not been so inconsistent from the protective point of view as the statutory statement of it. Possibly there was some chance of developing an infant industry. But the law as stated actually offered protection to the industry, not at the crucial moment, but when rails were being made in Canada in quantities sufficient to supply the Canadian demand. It appears, then, that the Liberal Party had completely abandoned its free-trade views, and had even declared itself in favor of a policy of permanent protection for fully developed industries. One marvels that the railways ever permitted the Liberal Party so far to forget its traditional policy.

The most marked effect of the steel-rail duty is that the iron and steel companies have been able to market steel rails, especially in times of depression, in India and Australia in competition with British, German, and American manufacturers.[4] Doubtless, the contention of the railroads that the companies have done this in order to maintain prices in Canada is a serious matter. But the practice is by far the most relevant feature of recent Canadian industrial development, and throws a good deal of light on the standing of the Canadian iron and steel industry.[5] Until the panic of 1907 the Canadian steel-rail mills had even more orders

[1] E. Porritt, *Sixty Years of Protection in Canada*, pp. 403–04.
[2] *Production of Iron and Steel in Canada*, 1912, p. 24.
[3] See Appendix G.
[4] *Iron Age*, vol. LXXXII, p. 1083.
[5] E. Porritt, *The Revolt in Canada*, pp. 133–38.

than they could fill. But halfway through 1908 there was a decrease in the demand for rails, and, while the "Soo" mill went off the active list in July, the Sydney mill recognized that it was impossible to secure orders at home. To keep its rail mill employed, the Sydney firm did as it had done before: it renewed its export business, and not without success. In September, 1908, 9000 tons of rails were sold to a railway in India; in November 18,000 tons were shipped to New South Wales, and a few days later the announcement was made that several orders had been secured from railways in Mexico. In 1909 the Great Northern Railway Company of England ordered 5000 tons from the Canadian firm.[1]

Canada rejoiced, of course, that a Canadian industry could meet foreign competitors in a world market. In this connection the Dominion Iron and Steel Company took the people of Canada into its confidence to a remarkable degree. The extent of the orders, the weight per yard of the rails, orders of shipment, and the pressure of the overseas' business on the rail mill were all emphasized. The exact price, which was kept a secret for a time, was supposed to be lower than that at which rails were being supplied to Canadian railways. Information of a definite character was forthcoming in 1909, when it appeared that the Dominion Iron and Steel company had offered to supply rails for the Transvaal, at a price about 7*s.* lower than an English quotation of £6 2*s.* 6*d.*, that is at about $28 per ton, laid down at Delagoa Bay, South Africa, duty paid.[2]

This dumping of rails was variously interpreted. The company defended it on the basis of keeping the men employed (some 3000 hands) [3] at a time of financial stringency, when the "Soo" mill had had to shut down. "Industrial Canada," the organ of the Canadian Manufacturers'

[1] *Montreal Witness*, April 30, 1909.
[2] *Commercial Intelligence*, July 28, 1909.
[3] *Iron Age*, vol. LXXXII, p. 1456.

Association, called it an achievement for the "National Policy," which had supposedly put the Canadian concern in a position to compete with the world.[1]

Some people were rudely critical. English companies claimed that this was a matter to be taken up at the Imperial Conference of 1911. Canadian railways urged that it was a system of dumping abroad to keep up prices at home. The abolition of the bounty system was advocated by most of those who discussed the matter, but the railways suggested the logical proposition; namely, that if the Dominion Iron and Steel Company could capture foreign business in the face of competition, it ought to be able to hold its own at home without assistance, and hence that unless equally favorable prices were offered Canadian consumers, the duty of $7 a ton should be abolished, or at least reduced.[2]

In reply to criticism, Mr. Plummer, the president of the Dominion Iron and Steel Company, said: "We consider our plant the equal of any in the world, and the location on tidewater is such that we are in a good position to export. We feel that we should endeavor to get our share of the world's market and have every intention of continuing to do so. In exporting rails, we are following the example of others in selling products to the best advantage. Prices abroad show a profit *quite apart from the Government bounty.*" In 1908 the general manager made the statement: "Orders for rails are coming from all over the world. The plant is in a position to furnish steel to the world's markets at $6 a ton less than Pittsburg."[3] As the railways contended, the frank discussion of the subject by the Dominion Iron and Steel interests was a most naïve admission that the $7 duty was no longer necessary.

[1] *Industrial Canada*, December, 1908.
[2] *Iron Age*, vol. LXXXII, p. 1456.
[3] *Montreal Witness*, Dec. 14, 1908.

§ 8. American competition has recently been the greatest danger to Canadian industry, and the dumping of United States products at sacrifice prices in Canadian markets has been a growing menace. Whenever a boom collapses, American iron producers cut prices in foreign markets, and this dumping is not done in the interests of the Canadian consumer of iron and is obviously a detriment to Canadian iron and steel producers.[1]

In 1903 United States iron and steel products were being dumped at low prices in competition with Canadian output.[2] Since it was a time of depression, this dumping feature was particularly bad. The iron and steel interests had long been pressing for higher duties, but the Government hesitated to give assistance by a general advance, so the dumping clause of 1904 was introduced to provide a system of countervailing duties on all such dumped goods.[3]

The Dumping Act provided that whenever it should appear to the satisfaction of the Minister of Customs or any officer of customs that the export price or the actual selling price to the importer in Canada of any imported dutiable article of a class or kind made or produced in Canada was less than the fair market value thereof, such articles should be subject to a special customs duty equal to the difference between such fair market value and such selling price, in addition to the duty otherwise established. The special duty was limited to one half of the customs duty otherwise established on most articles, and to 15 per cent *ad valorem* on items 224, 226, 228, 231[4] in Schedule A of the Customs Tariff, 1897. The expression "export price" was defined as the exporter's price for goods *exclusive* of all charges thereon after their shipment from the place from which they would be exported directly to Canada. Provision was

[1] *Iron Age*, vol. LXXII, Aug. 17, p. 32.

[2] *Ibid.*, vol. LXXIII, March 3, p. 18. [3] *Ibid.*, June 16, p. 29.

[4] Namely pig iron, cast scrap iron, iron kentledge, steel ingot blooms, slabs and billets, puddled bars, rolled iron and steel angles, etc., rolled iron and steel plates.

made for meeting evasion of the special duty by any mode of consignment; for the making of regulations deemed necessary for carrying out the provisions of the act, including temporary exemption of articles not made in Canada in substantial quantities, and offered for sale to all purchasers on equal terms; for the exemption of articles on which the duty was equal to 50 per cent *ad valorem*, and of goods the export price of which was only slightly under the fair market value, as well as goods subject to an excise duty in Canada. Rolled round wire rods, which were free of duty, were excepted from the exemption of free goods, provided that the special duty should not exceed 15 per cent.[1]

In 1907 the Dumping Act was made applicable to all free goods under the general law. From time to time a number of Orders-in-Council and regulations have been passed. A misunderstanding as to whether the duty applied to goods subject to specific duties was definitely ended by the inclusion of even free goods.[2] In May, 1907, exemption was made of iron and steel, rolled, drawn, or polished, when the difference between the fair market value and the selling price to the Canadian importer did not exceed 5 per cent of their fair market value. Other goods were exempted where the difference did not exceed $7\frac{1}{2}$ per cent. It was provided that the whole difference should be taken into account for special duty purposes when exceeding 5 per cent in the case of such iron and steel, and when exceeding $7\frac{1}{2}$ per cent in other cases. In December, 1908, it was provided that the special duty should, without exemption allowance, apply to galvanized wire, barbed wire, and round rolled wire rods of iron and steel of a class and kind made in Canada. In October, 1911, the Conservative Administration ordered that the duty should not apply to iron and steel tubing, when the difference did not exceed 5 per cent of the fair market value, provided that the whole

[1] 4 Ed. VII, 1904, chap. 11. [2] 6–7 Ed. VII, 1906, chap. 11.

difference should be taken into account for special duty purposes when exceeding 5 per cent, and that the duty should be applied without exemption to tubing over 4 inches and not exceeding 8 inches in diameter, such tubing being of a kind or class made in Canada.

The fair market price has been estimated on the usual credit basis except when an article is universally sold in the country of export for cash only, in which case the fair market value is estimated on the cash basis, provided that a *bona fide* discount for cash not exceeding $2\frac{1}{2}$ per cent, when allowed and deducted by the exporter on his invoice, may be allowed in estimating the fair market value for duty purposes.[1]

This new method of protecting Canadian manufacturers has been severely criticized. Nearly all agree that it is hard to tell what the market value is, when so many prices are quoted for different purchasers and since quoted prices are seldom actual prices. The iron and steel interests themselves admit that often the clause cannot be applied, as American furnaces sometimes sell part of their product for delivery to distant points in their own country at prices as low as for shipment to Canada. This is, however, necessitated by competition. American furnaces have to cut prices for certain markets to meet the prices of independent companies even within the protected market. One is not surprised, then, that the export price is low, when American iron has to meet avowedly efficient Canadian producers, protected not only by transportation rates, but especially by customs duties, and formerly even by bounties. The British preference gives a special reason for a differential price basis if the American producers are to sell in the Canadian market at all.

After all, the Dumping Clause seems to embody a declaration that the Canadian industry must not be sub-

[1] *Customs Tariff Act, 1907*, with Appendix (No. 6). Aug. 10, 1912 edition.

jected to external competition. Carried to its practical and logical conclusion, it means that American iron cannot be sold to Canadian importers at less than the price determined by the United States Steel Corporation or other American producers. If the Canadian Dumping Clause had worked as was intended, the Canadian price would necessarily be the United States price, plus transportation charges, as well as the Canadian duties. If such were the case, Canada would be in a situation worse than the United States, dominated, as it is, by the United States Steel Corporation. It is a strange community, indeed, that can accept such a declaration of commercial policy.

One is not surprised that the Dumping Clause aroused considerable discussion. The railways complained that they were deprived of an opportunity to buy rails abroad at greatly reduced prices.[1] The highly specialized iron and steel industries were especially grieved by not being able to buy supplies freely in the United States. The Canadian Bridge Company, for instance, located at Walkerville, Ontario, a convenient place to secure raw materials from Pittsburg,[2] made many complaints. The application of the duty to tin plate in 1908 raised such objection that it was repealed in 1909.[3] Some feared that discriminations in favor of importers in certain sections might follow the application of the law.[4] British chambers of commerce complained, almost as soon as the clause went into effect, of the onerous and complicated arrangements as to details in invoices, and Canadian importers find the process of making entry of goods an interminable burden.[5]

It is a difficult matter to determine to what extent dumping has actually taken place. Government documents do not state how often the special or dumping duty has been applied to iron and steel imports entering Canada, or how

[1] *Financial Post*, Feb. 27, 1909, p. 15.
[2] *Iron Age*, vol. LXXVI, p. 570.
[3] *Ibid.*, vol. LXXXIV, p. 338.
[4] *Debates*, 1904, p. 8847.
[5] *Iron Age*, vol. LXXXIV, p. 338.

much iron and steel has entered under the duty; but the sum of $20,470.95 was collected as special duty on iron and manufactures of iron, steel and manufactures of steel, or both combined, in the fiscal year ending March 31, 1912.[1]

Hence, we have to turn to an entirely different and quite as unsatisfactory source of information. The Canadian iron and steel firms have been in the habit of presenting figures to show that the price of iron and steel at Pittsburg for home consumption is frequently higher than the price of goods for export to Canada. An unsigned pamphlet, evidently published by the Canadian iron and steel interests, gives average prices for foundry pig iron at Chicago, Buffalo, Toronto, and Montreal, for the years 1906 to 1911, to show that, with a few exceptions, notably 1911, the prices of pig iron were higher in Canada than in the United States. This pamphlet also quotes averages of high and low prices for the period in order to prove that prices have been higher in the United States. The authors have, however, given absolutely no consideration to the possibility that the modal monthly or yearly price might support an altogether different conclusion. Besides, no reference to the source of the information is given, except in respect to the prices of steel bars.

As a matter of fact, the term "dumping" is quite generally misunderstood. The Dominion Iron and Steel Company declared itself a competitor in the world market — an equal of any producer in the world. In 1913 it declared itself ready to compete in the Canadian market with a Canadian branch of the United States Steel Corporation; and other iron and steel interests have declared that their plants are very efficient. If American producers are to market any part of their product in Canada, in competition with such efficient producers, they must pay a part of the duty, and possibly all of the railway charges. In other

[1] Private Correspondence, Department of Customs, Feb. 3, 1913.

words, much of this so-called dumping is due simply to the fact that American producers are forced to bear the burden of a part of the duty paid to the Canadian Government by reducing the prices of their exported product.

§ 9. One difficulty in determining the influence of protection is the fact that such a policy may assume different forms. In Canada both bounties and customs duties have been given, and customs duties have been both *ad valorem* and specific or mixed; hence, it is difficult to determine the exact amount of protection granted at different times or to different articles.

In general, one may say that the recent development of the Canadian iron and steel industry has taken place during a period of lower protection than existed prior to 1897. Although the Liberal Party has been accused of taking over the protective policy *in toto*, such a charge does not seem to be valid, at least so far as the iron and steel schedule is concerned. On most finished articles the duty was reduced in 1897 by 10 per cent of the duties previously imposed. Furthermore, the British preference provided for an additional reduction amounting to about one-quarter of the general duties in the new tariff. In 1900 the preference was increased to one third of the duties in force, and in 1907, the preferential tariff and the general tariff were again reduced by about $1\frac{1}{2}$ per cent in the adoption of units of $2\frac{1}{2}$ per cent. The application of a duty of $7 per ton on steel rails weighing over 45 pounds per yard in 1903, the payment of bounties on wire rods between 1903 and 1911, and on rolled angles, tees, plates, etc., between 1903 and 1906, the provision of duties of $3 per ton under the general tariff and $2 under preferential tariff on rolled angles, tees, plates, etc., in 1906, when the bounties on these articles were withdrawn, the provision of duties on wire rods, and the advance of duties on heavier structural steel in 1914, are practically the only exceptions to the reduction of pro-

tection in this schedule covering a large number of items and an important volume of imports.

Although the duties on certain articles, especially pig iron, wrought scrap iron and steel, steel billets, and bars were very considerably reduced by the revision of 1896, the bounty system was continued and extended as compensation to the primary industry. Some, believing that American producers with their dumping policy would be able to nullify the efforts of tariff duties, thought that the bounties would prove a greater assistance to the Canadian industry than tariff duties; but this argument does not appear sound. The United States Steel Corporation and other American producers sell at cut prices to meet competition at any point, whether that market is protected by a duty or whether it is simply a competitive point within the United States itself. The bounty system, by offsetting some of the costs of production of iron and steel in Canada, has had the same effect on the so-called dumping of American products that higher tariff duties would have had. The only difference in the two forms of protection lies in the changed nature of the competition. Tariff duties might have increased the cost of laying down American products in Canada; the bounties have necessitated the sale of American products at prices low enough to meet the price of the bounty-subsidized Canadian product. The prevention of dumping is not, therefore, a special virtue of a bounty system. Indeed, bounties are granted precisely in order that the prices of goods may be low enough to meet any possible competition, and that the manufacturing consumers may have the benefit of cheap raw materials.

As a matter of fact, the bounty system has made possible the gradual reduction of the total amount of protection. For instance, we find that the bounties on pig iron made from foreign ore scaled down from $2 per ton in 1897 to $1.10 in 1906, and that they have since gradually disappeared. The bounties on rolled, round wire rods were an

exception in that they were suddenly cut off in 1911. The substitution of specific duties in 1906 compensated for the abolition of the bounties on manufactures of steel, and protection has now been given the producers of wire rods in 1914, three years after the bounties ended. Considering, however, that the duties on pig iron, bars, and billets, as well as on scrap iron and steel, were large before 1896, the gradual disappearance of the compensatory bounties on these primary products has effected an important reduction of the total protection previously granted.

In short, with the exception of a few items there has been a gradual but real reduction of the total amount of protection since 1897, especially that in favor of the production of primary products. That this was a period during which the Canadian iron and steel industry made quite unprecedented progress will appear from the historical account of its development to which we now turn.

CHAPTER IX

THE RECENT HISTORY OF THE INDUSTRY

§ 1. Arguments which advocates for protection advance in favor of their policy cannot be accepted without criticism. In defending themselves against inevitable criticism, those politicians who establish a policy usually exaggerate the merits of their solution of a problem and continue their policy once it has been adopted. Moreover criticism of the policy is apt to bear the flavor of partisan interest. Both criticism and advocacy of protection are likely to have purposes but little related to the general welfare of the country.

Some of the arguments for protection have already been fully considered, and their merits have been weighed so far as possible. One other claim in favor of protection, particularly of the bounty system, has been put forth with vigor and conviction during recent years. That the Canadian iron and steel industry has developed in a remarkable way during the twentieth century is apparent to all who have followed recent Canadian industrial progress. Most people who have discussed this subject have simply assumed that the Canadian iron and steel industry was the offspring of the commercial policy of the period. As a matter of fact, other and more important factors have contributed largely to this significant increase of output, and the growth of the industry is not necessarily evidence of the success, and much less a justification, of such a policy.

We must, of course, thoroughly understand the development of the industry in order to come to a scientific conclusion as to the effect of the tariff and bounty system on that development, or to estimate the wisdom of the system itself. The subject of this chapter is a review of the

progress of the industry during the period from 1896 to 1914, and its chief purpose is to ascertain those factors that have most affected the course of events. The "how" and the "why" of the progress is the important consideration that needs to be judged with an open mind after weighing the facts. What part the tariff and bounty system has played will be given special attention.

§ 2. Undoubtedly, the Canadian iron and steel industry has made wonderful strides in its various phases during recent years. The number of plants and blast furnaces, the capacity, and the output increased greatly between 1896 and 1914. In 1896 only six furnaces produced pig iron in Canada. The furnace at Hamilton, Ontario, had a capacity of 200 tons daily; the one at Londonderry, 100 tons; that at Radnor Forges, 25 tons; two at Drummondville, 7 and 8 tons; and the Ferrona furnace had a capacity of 125 tons.[1] In 1911 the Dominion Steel Corporation had four completed furnaces each of 280 tons' capacity per day. This corporation built two more of the same size in 1912. The Nova Scotia Steel and Coal Company operated at Sydney Mines one furnace with a capacity of 200 tons (its Ferrona furnace had been abandoned as early as 1903). The Canada Iron Corporation owned a furnace of 100 tons' capacity at Londonderry, Nova Scotia; two small furnaces of 7 and 8 tons' capacity at Drummondville, Quebec, a 25-ton furnace at Radnor Forges, Quebec, and two furnaces of 125 and 250 tons' capacity at Midland, Ontario. A furnace of 65 tons' capacity was operated at Deseronto, Ontario. The Steel Company of Canada had two furnaces of 200 and 300 tons' capacity at Hamilton, Ontario. The Algoma Steel Company had three furnaces, two of 200 tons' capacity, and one of 450 tons' capacity, at Sault Ste. Marie. The Atikokan Iron Company had one furnace of 100 tons' capacity at Port Arthur, Ontario. In 1913 the

[1] *Production of Iron and Steel in Canada*, 1911, p. 13.

Canadian Furnace Company put up a 350-ton furnace. In addition to the ordinary furnaces, there were a few small electric furnaces in operation in Welland, Toronto, and elsewhere.

This indicates a growing development in the production of pig iron, and it is natural that the production of steel and of iron and steel products should advance in correspondence with this progress. Not only were many more furnaces built, but the new furnaces were almost universally of greater capacity and were, as a rule, more regularly operated, though not always to full capacity.

It is not surprising to find that the figures for the output of pig iron indicate a more rapid advance than the figures representing the number of furnaces.[1] For the fiscal years 1909, 1910, and 1911, the combined product amounted to 1,937,144 tons; over 19 times the product of 104,882 tons in the years 1896, 1897, and 1898.[2] Add to this the amount produced and exported, on which, therefore, no bounties were paid in the more recent period, and the output is enlarged by 16,342 tons.[3] A consideration of percentages shows that the proportion of home produce to total consumption advanced from 36.2 per cent in 1884 to 47.5 per cent in 1895, and to 66.9 per cent in 1911. The lowest percentage of home product to total consumption since 1900 was 64.5 [4] in 1907.

A comparison of the Canadian output of pig iron with the output of the United States and with the total output of the world shows growth in a different way. (See table on next page.)

The Canadian percentage of the world's pig-iron production rose from .221 per cent in 1900 to .608 per cent in 1901, to 1.142 per cent in 1910, and to 1.324 per cent in 1911.

[1] Appendix B, Table I.

[2] The total production of pig iron in the calendar year 1913 amounted to 1,023,973 metric tons.

[3] *Canada Year Book*, 1911, p. 108.

[4] Appendix B, Table I.

Pig iron (metric tons) produced in Canada, the United States, and the world, and the percentages of Canadian to the world output in the calendar years 1900 to 1913, inclusive [1]

Year (calendar)	Canada	United States	World	Percentage
1900	87,512	14,009,870	39,599,437	.221
1901	248,896	16,132,408	40,950,692	.608
1902	325,076	18,003,448	44,342,579	.733
1903	269,665	18,297,400	47,113,730	.585
1904	274,777	16,760,986	46,069,501	.589
1905	475,491	23,340,258	54,054,783	.879
1906	550,618	25,706,882	59,074,861	.932
1907	590,444	26,193,863	60,680,014	.973
1908	572,123	16,190,994	48,640,479	1.175
1909	687,923	26,108,199	61,217,064	1.123
1910	752,090	27,636,687	65,908,674	1.142
1911	837,558	24,027,733	63,210,694	1.325
1912	927,484	30,202,568	—	—
1913	1,023,973	—	—	—

Those percentages seem small, but the output for 1901 was almost three times that for 1900, the output for 1905 over five times that of 1900, and the output for 1913 almost twelve times that for 1900. Canada became the eighth producing nation of the world by moving ahead of Sweden in 1908.[2] Meanwhile, the output of the United States increased from a little over 14,000,000 metric tons in 1900 to something more than 23,000,000 metric tons in 1905 and to approximately 30,000,000 metric tons in 1912. In other words, the Canadian production has developed relatively, though not absolutely faster than that of the United States. It is still too early to expect the Canadian product to increase absolutely faster, even though the relative advance is high.

Likewise, the manufacture of steel in Canada has had a growth even more rapid than the growth of the world production of steel. The following table shows that the per-

[1] *Mineral Industry*, 1910, p. 381; 1911, p. 435; 1912, p. 442; 1913, p. 423.

[2] Canada, *Report on Mineral Production, 1907 to 1908*, p. 78.

centage of Canadian to world output advanced from .083 in 1900 to .529 in 1902, to .919 in 1905, and to 1.508 in 1911. The Canadian output for 1902 was eight times as large as that of 1900; the output for 1905 was over seven times as large as that of 1900, and the output of 1911 was almost thirty-seven times as large as that of 1900. Meanwhile, the output of the United States increased from over 10,000,000 tons in 1900 to 20,000,000 tons in 1905, and to 31,000,000 tons in 1913. In short, the American output was little more than tripled in thirteen years.

Steel production (metric tons) in Canada, the United States, and the world, and the percentage of Canadian to the world output for the calendar years 1900 to 1913[1]

Year	Canada	United States	World	Percentage
1900	23,954	10,382,069	28,727,239	.083
1901	26,501	13,689,175	31,449,869	.084
1902	184,950	15,186,406	34,972,497	.529
1903	181,514	14,756,691	36,298,414	.500
1904	151,165	13,746,051	36,148,079	.414
1905	403,449	20,354,291	43,900,648	.919
1906	515,200	23,772,506	49,635,998	1.040
1907	516,300	23,733,391	51,273,340	1.007
1908	598,183	14,247,619	44,359,522	1.348
1909	766,795	24,338,302	53,499,974	1.433
1910	835,478	26,512,437	58,656,312	1.424
1911	880,278	24,054,918	58,375,701	1.501
1912	—	31,751,324	—	—
1913	—	31,822,555	—	—

§ 3. Let us turn now to the development of specific Canadian industrial enterprises. Few have had so enviable a reputation as the Nova Scotia Steel and Coal Company and the firms out of which it has grown. The early development of the Nova Scotia Steel Company, down to 1896, we have already considered. The original reasons for placing the furnaces at Ferrona were the immense deposit of ore

[1] *Mineral Industry*, 1911, p. 435; 1913, p. 423.

and the proximity to coal and limestone, thought to be located there. But as early as 1896 difficulties were experienced with the fuel, and after several trials with Cape Breton coal the company ordered a large amount from the General Mining Association of Nova Scotia. This change, together with the fact that the company was procuring an increasing amount of ore from the Wabana Mine, Newfoundland, led to the suggestion that the furnace work should be removed to Cape Breton.[1]

Nothing was done, however, for several years. In 1899 the output was larger than ever before. High prices prevailed, ore was being shipped abroad, and profits and dividends were high.[2] As the supply of coal from the Pictou fields was quite inadequate, the company had to make a change. Accordingly, in 1900, the Nova Scotia Steel Company acquired all the properties, rights, and leases of the General Mining Association at Sydney Mines, Cape Breton.[3] Preparation was thus made for more extensive operations. In 1901 considerable additions and improvements were made to the works at Ferrona and Trenton, and a large new coal-shipping pier was built at North Sydney.[4] New coal areas were opened at Trenton for steam and heating purposes at the steel works, and at Sydney Mines to secure coal for coking purposes.[5] Also an expert was employed to make a careful survey of the iron areas near Arisaig and Antigonish.[6]

In view of these developments, the Nova Scotia Steel and Coal Company was formed, absorbing the General Mining Association, the directors of which became the directors of the new organization.[7]

Meanwhile, coke ovens had been built at Sydney Mines, since it was cheaper to ship coke than coal.[8] But as coke

[1] *Monetary Times*, vol. xxx, p. 924.
[2] *Ibid.*, vol. xxxiii, p. 1187.
[3] *Ibid.*, vol. xxxiv, p. 618.
[4] *Ibid.*, vol. xxxv, p. 493.
[5] *Canadian Mining Review*, vol. xx, p. 168.
[6] *Monetary Times*, vol. xxxv, p. 166.
[7] *Ibid.*, p. 197.
[8] *Ibid.*, vol. xxxvi, p. 274.

depreciates in quality when transported any distance, it would have been more satisfactory to produce the iron near the coal mines and coking ovens. Moreover, the greater proportion of the ore used at Ferrona came from Wabana, and the distance of transport from Wabana to Ferrona exceeded that to Sydney Mines by over one hundred miles. Since piers had already been built at North Sydney, near Sydney Mines, the production of pig iron and steel at Sydney Mines would have been more economical. Steel could have been shipped to Ferrona and Trenton to be worked up into finished products. In March, 1902, the company decided to build immediately at Sydney Mines.[1]

The subsequent history of the Nova Scotia Steel and Coal Company is a story of steady and aggressive progress in the output of ore, pig iron, billets, and finished products. Even before the new blast furnace was built, the increasing demand for coal could not be met.[2] The additional output of iron demanded an 80 per cent increase in the output of coal in 1903.[3] Another large colliery at Bras d'Or Lake was opened, and a second large shipping pier was built at North Sydney.[4] The output of iron ore was increased from 4000 to 5000 tons daily, and exports were made to Rotterdam and Glasgow. While the works at Trenton and Ferrona were employed at full capacity, the new blast furnace was being built.[5] The year 1904 marked the completion of the policy of expansion in Cape Breton. It was claimed that the Sydney Mines coal mines was the only paying part of the old plant. The coal mine at Coalburn, Nova Scotia, on which over $500,000 had been spent, was worthless,[6] the Ferrona plant had outgrown its usefulness, and the furnace was becoming obsolete.[7] For these reasons the old furnace at Ferrona was closed down,[8]

[1] *Monetary Times*, vol. xxxv, p. 1194.
[2] *Ibid.*, vol. xxxvi, p. 346.
[3] *Ibid.*, vol. xxxvii, p. 836.
[4] *Ibid.*, vol. xxxvi, p. 1601.
[5] *Ibid.*, vol. xxxvii, p. 187.
[6] *Ibid.*, vol. xxxviii, p. 166.
[7] *Ibid.*, p. 195.
[8] *Ibid.*, pp. 227–28.

when the new blast furnace was opened in September of 1904.

With a view to increasing operations in new and more profitable branches, one battery of 30 Bauer retort coke ovens, three batteries of 40 Bernard retort ovens, three 40-ton open-hearth steel furnaces of the modern type of the basic Siemens-Martin process were erected,[1] and all were in operation by July, 1905.[2] In 1905 a rolling furnace, to be used as a mixer, was installed,[3] and large submarine ore areas were purchased north of Wabana.[4] The year 1907 saw the acquisition of iron ore areas in Brazil.[5] In 1908 a new colliery was opened at Sydney Mines, a new forge building constructed and other improvements made at New Glasgow.[6] In 1909 and 1910 development work was kept up at Wabana by the installation of new machinery. In 1910 the blast furnace and open-hearth furnaces were remodeled.[7] In the same year the increasing demand for finished products warranted extensions at New Glasgow, including two new rolling mills, with the necessary power plant and other devices, such as a 25-ton electric crane for disposing of the increasing output.[8] In 1911 machinery for handling all kinds of heavy steel forgings was installed in a plant which surpasses everything of the kind in Canada. This machinery will be able to meet all Canadian requirements in forgings for the next few years.[9]

In 1912 the Eastern Car Company was formed by directors of the Nova Scotia Steel and Coal Company to build steel railway cars at New Glasgow at a plant in close proximity to the steel plant. In 1913 a new colliery was

[1] *Canadian Mining Review*, vol. XXIII, p. 77.
[2] *Monetary Times*, vol. XXXVIII, p. 1349.
[3] *Commercial and Financial Chronicle*, vol. LXXXIII, p. 210.
[4] *Monetary Times*, vol. XXXVI, p. 417.
[5] *Canadian Mining Journal*, vol. XXVII, p. 158.
[6] *Ibid.*, vol. XXIX, p. 61. [7] *Monetary Times*, vol. XLVI, p. 544.
[8] *Ibid.*, vol. XLIV, p. 122.
[9] *Canadian Mining Journal*, vol. XXXII, p. 325.

opened and a 50-ton open-hearth furnace built at Sydney Mines. A bolt and rivet factory was erected at New Glasgow to produce material for the Eastern Car Company.[1] The Nova Scotia Steel and Coal Company is living up to its reputation of entering into every profitable branch of the steel trade.[2]

Altogether the properties of the Nova Scotia Steel and Coal Company form now a very satisfactory and complete unit. The ore-beds at Wabana, including the submarine areas, give evidence of being more valuable than was at first thought.[3] The coal mines at Sydney Mines are very extensive and contain probably 1,000,000,000 tons,[4] and the coal produced by five collieries is excellent for the production of coke for smelting. The limestone quarry of 250 acres at Point Edward, Cape Breton, is connected with the furnace at Sydney Mines by seventeen miles of the Intercolonial Railway. The limestone is very uniform and suitable for steel-making. Other properties are held in reserve.[5] The blast furnace is nearer to coal than any other plant in the Dominion, inasmuch as the headgear of the mine, from which coal is secured for coking, is within sight of the furnace.[6] The machinery is of the most modern character. Coal-washers, coke ovens, coal and ore piers at North Sydney and Wabana, the railway connecting North Sydney with the various plants at Sydney Mines, steel furnaces, repair shops, and foundries, dwelling houses, and stores at Sydney Mines complete a most efficient plant for the production of pig iron and steel billets.

The works of the company from which its finished products are shipped are situated at New Glasgow, Nova Scotia. This plant includes two large continuous steel furnaces, plate mills, guide mills, spike machines, forges,

[1] *Monetary Times*, vol. XLVII, p. 2223. [2] *Ibid.*, vol. LI, p. 250.
[3] *Ibid.*, vol. XLIII, p. 2034.
[4] *Souvenir of Nova Scotia Steel and Coal Company*, 1910, p. 20.
[5] Canada, *Report on Mining and Metallurgical Industries*, pp. 551–56.
[6] *Canadian Mining Institute Bulletin*, January, 1909, p. 40.

car axles and machine shops, structural steel shops, etc., of the most modern character.

The success of the Nova Scotia Steel and Coal Company is a byword in Canadian finance. This company is one of a few that has had a steady growth in output and earnings from its inception.[1] Scarcity of labor has been at times a dangerous handicap; but the use of labor-saving devices and modern machinery, as well as the rounding out of the plant, has so reduced costs as to place the company on a very favorable competitive basis.[2] The company seems to have had a faculty for meeting special conditions by the adoption of original mechanical devices, and other inventions.[3]

Cautious, conservative, yet at the same time aggressive management has been an important factor during the period of development.[4] Many improvements had been made out of earnings, until a recent change in policy led to the issuing of a common stock bonus or dividend of $1,000,000 in 1909, to cover such outlay.

The varied nature of the output has ordinarily been an advantage. Since all lines of production are not apt to be affected by competition and low prices at the same time, profits are less liable to extreme fluctuation. More recent specialization in the direction of railway supplies has probably somewhat reduced this advantage; especially as the company does not produce steel rails, and hence does not directly benefit from new railway construction. During 1911 prices of iron and steel were low, but this difficulty was met by a reduction of costs. That the profits did not fall off shows that substantial economies have been effected; and altogether that the company has passed through the stage of development during which it needed assistance.

[1] McCuaig's Circulars, June 28, 1911.
[2] *Monetary Times*, vol. XLIV, p. 122.
[3] *Canadian Mining Institute Bulletin*, January, 1909, p. 43.
[4] *Canadian Mining Review*, vol. XXIII, p. 103.

§ 4. If the growth of the Nova Scotia Steel and Coal Company has been admirably conservative, yet regular, that of the Dominion Iron and Steel Company has been spectacular, but fluctuating.

The inspiration for the venture came from a well-known Boston capitalist and financier, Mr. Henry M. Whitney,[1] who had already become a familiar figure in Canadian finance through his connection with the Dominion Coal Company. In 1893 the Dominion Coal Company revolutionized the whole coal trade by expanding its marketing to New England and St. Lawrence ports. The Canadian market, however, was limited during the close of navigation on the St. Lawrence in winter, when the coal company had either to bank its product or close down. Then the Boston Smoke Nuisance Law of 1896 reduced the American market for Nova Scotia coal, which is none too clean. Moreover, the increase in 1897 from 40 to 67 cents in the duty on coal entering the United States resulted in an increase in the duties collected on Nova Scotia coal from $499,682 in 1897 to $786,587 in 1898; an increase in the average *ad valorem* duty from 14.24 per cent to 24.15 per cent,[2] and a decrease in the amount of coal sold in New England. At its best the United States offered a fickle market for Canadian coal.[3]

It was to relieve this situation that Mr. Whitney proceeded to establish large iron and steel works at Sydney as an advantageously regular purchaser of the output of coal. In 1899 the Dominion Iron and Steel Company made a contract with the Dominion Coal Company for the supply of coal from the Phelan seam, which on analysis had proved suitable for the manufacture of iron and steel.

Evidently, the iron and steel project had some merits of

[1] McGrath, *op. cit.*, p. 372.

[2] United States, *Tariff Comparison*, part II, Table of Imports, 1894–1904, p. 755.

[3] *Canadian Mining Review*, vol. XXII, p. 137.

its own. When, in 1898 and 1899, it was reported that a large iron and steel plant was to be built at Sydney, financial and trade papers immediately vied with one another in a glowing description of the favorable conditions under which the enterprise would be launched. The feature from which most was expected was the nature of the ore mines at Wabana, Bell Island, Newfoundland, which had been purchased from the Nova Scotia Steel Company for $1,000,000. It was reported that the possession of the mine would enable the new company to procure ore at a lower price, to manufacture cheaper, and to sell for less than any other producer in the world, and at the same time to make as large profits as any competitor. Ore could be fed to the blast furnaces at Sydney at a maximum cost of $1.25 per ton. Minnesota ore had to be carried by rail from the mines to the Lake, then shipped through the Lakes and canals to a port on Lake Erie, unloaded and carried by rail again to the furnace mouth. Wabana ore could be mined by open cut and loaded on board ship at a single handling for 45 cents per ton as compared with 50 to 80 cents for mining alone in Minnesota. It could be shipped 380 miles over the Gulf of St. Lawrence in the largest ocean-going vessels at a cost of 45 cents a ton, as compared with a water rate of about $1 per ton for shipments down the Lakes. It is true that the Wabana ore is not so rich as that of the Lake Superior region, but it is a high-grade ore which mixes readily with others. In short, Sydney was to have ores at a cost of $1.25 as compared with $2.50 to $3.25 per ton at Pittsburg.[1] There seems to have been some justification for such hopes, for in 1907 the cost of iron ores at Sydney was 82 cents per ton.[2]

Proximity to the European market was another favorable condition. Nearly all American furnaces are handicapped by remoteness from the seaboard. The Pittsburg

[1] McGrath, *op. cit.*, p. 381.

[2] Canada, *Report of Mining and Metallurgical Industries*, p. 537.

output has to be hauled by rail to tidewater, an average distance of 450 miles, at a cost of half a cent per mile per ton, or $2.25 per ton. Alabama iron reaches New Orleans after a carriage of 530 miles at a cost of $2.65 per ton. This advantage was increased by the fact that Sydney is 800 miles nearer to Liverpool than is New York, and 2200 miles nearer than New Orleans. Sydney's position on a splendid harbor on the seaboard, where ores and coal could be cheaply assembled and from which products could be conveniently shipped, certainly offered an extraordinary advantage.

It was estimated that low costs of production at Sydney, together with low freight rates to Europe, would permit the firm to lay down iron and steel in England at a handsome profit even in times of depression. The company expected to land pig iron in Liverpool at a cost of $8 per ton, and steel billets at $13, while the average price at which these had sold in England for the decade 1890 to 1900 had been $14.60 for pig iron and $22.90 for steel billets.[1] Such an opportunity was not to be overlooked. The organization of the industry was to be in the hands of the most capable men that money could procure; every stage of development was to be properly cared for; the plant was to be of the most advanced type, and the firm was to profit by the experience of existing industries on both sides of the Atlantic.

Sydney was chosen as the site of the steel works because it was already the outlet of the coal trade; it was located in the center of the coal and limestone area; it possessed a tract of land near the waterfront eminently suited to the purpose; the harbor was capacious and safe, and already known as a coaling port; it was a terminus of the Intercolonial Railway and a point of call of many American and Canadian coastal steamers; and a 40-mile railway connected Sydney with Louisburg, an all-winter shipping

[1] McGrath, *op. cit.*, pp. 376–84.

port.[1] The promise of exemption from local taxation for thirty years and a grant of five hundred acres of property on the harbor [2] were other inducements to build at Sydney.

It has been said that if the Dominion Government had not granted bounties, the Dominion Iron and Steel Company might not have begun the enterprise. Certainly, an estimate that bounties amounting to $8,095,000 would be received before 1908 was no small encouragement to "timid" capital.[3] My own opinion is that the Sydney plant would have been built in any case. That the real causes for the development of this important company were industrial has been frankly acknowledged in a letter written in 1900 to Mr. H. M. Whitney by Mr. Graham Fraser, then general manager of the Nova Scotia Steel Company. After a conference the two interests agreed to coöperate to get the bounties extended for a period of five years from 1902. Although the bounties would help in securing capital, Mr. Whitney was willing to go on with the works whether or not the bounties were given. In 1903 a letter from Mr. Fraser to Mr. Whitney was quoted by Mr. Borden, leader of the Conservative Opposition, to show that Sir Charles Tupper, rather than the Liberal Party, had been responsible for the development of the Dominion Iron and Steel Company, inasmuch as Sir Charles had introduced Mr. Whitney to influential financial interests in England. Mr. Graham wrote: "You [Whitney] stated in 1899 that you thought we had better go on with our new works, as you did not believe the Government would extend the bounties. As Sir Charles Tupper was going over to England, you could get him to introduce you to parties who would find the capital. I replied that if you begin to build the large plant you are talking of, I do not believe the bounties will be extended."[4] A more naïve confession of the

[1] McGrath, *op. cit.*, p. 372. [2] *Ibid.*, pp. 384–85.
[3] *Commercial and Financial Chronicle*, vol. LXXII, p. 583.
[4] *Debates*, 1903, pp. 7933–35.

methods used to extort Government favors and of the fact that the plant would in all probability have been built can scarcely be conceived.

By 1900 extensive building operations were being carried on. Four blast furnaces of the latest type and capable of producing 250 to 400 tons of pig iron daily, ten basic open-hearth steel furnaces of 1000 tons' daily capacity, a 35-inch blooming mill, 400 Hoffman coke ovens, a coal-washing plant, and a large machine shop and foundry were installed.[1] The coking plant was put in operation as early as December, 1900.[2] Skilled labor was imported from Europe.[3] Since the limestone deposits at Sydney appeared to be less extensive than had been expected,[4] large quarries at Bras d'Or Lake were purchased to insure an adequate supply of fluxing materials. The first furnaces were blown in on February 2, 1901, and others in October, 1901.[5] Pig iron was shipped to Scotland and to the United States later in the year.[6] The manufacture of steel was commenced in December, 1901, with highly satisfactory results, according to a test made by the Baldwin Locomotive Works of Philadelphia.[7] Steel ingots were shipped to Scotland, pending the completion of the billet mill.[8] The building of a steel-rail mill was seriously contemplated in 1901, but the purchase of rails elsewhere by the Dominion Government in 1902 altered the plans of the company. The production of structural steel, for which there was a larger Canadian market, was favored for a time.[9] The completion and perfection of the organization of other departments, such

[1] E. Phillips, "Competition in the Iron and Steel Industry," *Engineering Magazine*, vol. XXI, p. 345.
[2] *Commercial and Financial Chronicle*, vol. LXXI, p. 1169.
[3] *Iron Age*, vol. LXVII, September 5, p. 41.
[4] *Monetary Times*, vol. XXXIV, p. 264.
[5] *Commercial and Financial Chronicle*, vol. LXXIII, p. 959.
[6] *Monetary Times*, vol. XXXV, p. 618.
[7] *Ibid.*, p. 843.
[8] E. Porritt, *Sixty Years of Protection in Canada*, p. 127.
[9] *Iron Age*, vol. LXX, December 25, p. 3.

as the coal-washing plant, was thought advisable, before pushing the rail mill to completion.[1] Modern machinery was placed in the mines and at the shipping piers.[2] Additional ore areas were purchased in Cuba and Labrador, and Swedish ores were imported to mix with the Wabana ores.[3]

The Dominion Iron and Steel Company has not always enjoyed favorable financial conditions. Indeed, the company has on several occasions faced serious financial embarrassment. Although it has never been insolvent, the irregularities caused by extravagance and prolonged conflict with the Dominion Coal Company have been very serious.

In the first place there was much reckless outlay of funds. Whitney, the president, and Moxham, the general manager, were as extravagant in building the plant as in talking of it. Frequent changes in the official staff and lack of coördination of the different departments had an unfavorable effect.[4] It is said that the whole works could have been built for two thirds of what they cost and that $7,000,000 or $8,000,000 was wasted. Moxham had no idea of costs, nor did he know how to organize and adjust the various departments. He failed to ascertain at an early date just what class of steel could be made from the ore, which was discovered to be non-Bessemer after considerable expenditure had been made.[5] He seemed to think that cheap ore and coal would place the finished product in the world market at any time, but the company found that it could afford to sell pig iron and steel billets only in times of exceptionally high prices.[6] The directorate itself was largely ignorant of the business. The ore mines did not turn out as expected at first; and, as we shall see, the coal supply was a constant source of trouble.[7]

[1] *Commercial and Financial Chronicle*, vol. LXXV, p. 27.
[2] *Ibid.*, p. 27.
[3] *Monetary Times*, vol. XXXVI, p. 171.
[4] *Canadian Mining Review*, vol. XX, p. 76.
[5] *Ibid.*, vol. XXII, p. 186.
[6] *Ibid.*, vol. XXIII, p. 103.
[7] Jeans, *op. cit.*, pp. 123–25.

The subsequent rounding-out and extension of the plant has been conducted, for the greater part, under unfavorable financial conditions caused by the initial extravagance and the increase of floating debt involved in the relations with the Dominion Coal Company. The lease of the properties of the Dominion Coal Company at an excessive rental soon resulted in a large floating debt, which amounted to $2,500,000 in 1903, at a time when financial conditions were not favorable to issuing new bonds, either for retirement of the debt or for construction.[1]

In spite of financial difficulties the plant was gradually made efficient. The lease was canceled and a new coal contract arranged. In 1903 the blast furnaces had a greater capacity than the steel plant, and the steel plant itself had to sell its product in the unfinished state [2] in the United States and Scotland as well as in Canada.[3] As the demand for steel billets in the United States had fallen off and prices had declined, the open-hearth furnaces were closed and the night shift taken off the blooming mills.[4] Since finished products are always more marketable [5] than primary products, the company decided to erect finishing mills. The idea of exporting seems to have been conveniently forgotten. Plans for a rail mill, with a capacity of 1000 tons instead of 3000 tons per day, were made, with the idea that such a mill would be large enough to take care of the Canadian trade. The erection of rod mills, of plate, angle, and bar mills, was also suggested.[6]

The realization of some of these plans took several years. To reduce costs during the period of stress, wages and salaries were reduced,[7] and a long-continued strike, in protest, practically shut down the entire works.[8] Ultimately the

[1] *Commercial and Financial Chronicle,* vol. LXXV, p. 1402.
[2] *Iron Age,* vol. LXXII, July 30, p. 27.
[3] *Monetary Times,* vol. XXXVI, p. 734. [4] *Ibid.,* vol. XXXVII, p. 149.
[5] *Ibid.,* p. 149. [6] *Ibid.,* vol. XXXVI, p. 1304.
[7] *Commercial and Financial Chronicle,* vol. LXXVII, p. 2337.
[8] E. Porritt, *The Revolt in Canada,* p. 130.

men returned to work at the old rates,[1] but only after the strike had cost the company about $500,000.[2]

The wire-rod mill was in operation in 1904, and its product gave satisfaction to consumers.[3] So many orders were received that a double shift was put on in December, 1904.[4] Unfortunately, as soon as the wire-rod mill was in a condition to produce, the United States Steel Corporation presented a contract to Canadian wire-drawers and nail-makers, engaging them to buy all rods for six months from it. All wire-makers except James Pender, of St. John, New Brunswick, who had already arranged to buy from the Dominion Iron and Steel Company, were forced to sign. In spite of this drawback, by 1905, the rod mill was described as "running to perfection," and was supplying eighty-five per cent of the iron rods used in Canada. Eleven of the thirteen nail factories were purchasing from it.[5] The steel-rail mill was in operation by June, 1905, and doing good work on Government orders.[6]

In the latter part of 1906 a dispute with the coal company, in regard to the quantity and grade of coal to be delivered, forced the steel company to bank its furnaces. The extended lawsuit that followed necessitated asking for a large amount of credit from the banks to cover an increasing floating debt, and to cover large items of accounts receivable and of raw and manufactured material.[7] An adverse court decision might have completely wiped out the claim against the coal company, and have left the steel company with liabilities it could not meet. The carrying of the case from one court to another, with no prospect of immediate settlement, the necessity for a larger amount

[1] *Commercial and Financial Chronicle*, vol. LXXVIII, p. 2337.
[2] *Monetary Times*, vol. LXXIX, p. 502.
[3] *Canadian Mining Review*, vol. XXIII, p. 254.
[4] *Monetary Times*, vol. XXXVIII, p. 724.
[5] *Iron Age*, vol. XXXVIII, p. 1350.
[6] *Ibid.*, vol. LXXVI, p. 571.
[7] *Commercial and Financial Chronicle*, vol. LXXXVII, p. 99.

of working capital,[1] as well as more capital for extensions, if the policy of rounding-out the plant was to be continued, all made advisable a reorganization of finances to reduce fixed charges. This included a reduction of the sinking funds, from $257,500 per year for the period 1908 to 1911, to $164,170 for the period thereafter.[2]

During 1907 and 1908 the Dominion Iron and Steel Company was one of the few companies that did not suffer from the depression of trade. Although nearly all other mills were closed for a time, all departments of the Dominion Iron and Steel Company were kept in full operation, and the volume of the business was maintained with steady employment and no decrease of wages for the employees.[3] Naturally the curtailment of the home market and low prices were disadvantages, but these were offset by the exportation of steel rails to England and India.[4] Conditions were practically the same in 1909. Large orders came in regularly for both rails and rods. Mr. Plummer, the president, reported that the orders of the company were beyond its capacity and that extensions had to be pushed.[5]

When the coal difficulty was partly settled through the payment by the coal company of $2,750,000 in the early part of 1909,[6] the floating debt was paid off, and the company had a cash reserve.[7] Since then financial and industrial operations have been comparatively unhampered. There has been a continuous recovery from the precarious position rendered inevitable by prolonged litigation. A report by British experts in 1909 said that "no iron and steel works is in a better position for the supply of cheap raw materials for the manufacture of pig iron and steel. The fact that they own very valuable ore and limestone properties, together with a special agreement whereby they

[1] *Commercial and Financial Chronicle*, vol. LXXXVI, p. 1587.
[2] Estimated.
[3] *Monetary Times*, vol. XLII, p. 2280.
[4] *Commercial and Financial Chronicle*, vol. LXXXVIII, p. 1616.
[5] *Ibid.*, vol. LXXXIX, p. 595.
[6] *Ibid.*, vol. LXXXVIII, p. 675.
[7] *Ibid.*, p. 1064.

are assured of cheap fuel supply, renders them independent of market fluctuations and places them in a most exceptional position. The cost of mining the 100,000,000 tons of ore in sight is likely to remain so low as to yield a handsome profit either by converting it into finished products or by selling it in the open market." [1]

This report, so widely published, seemed to justify extensions to increase the output and reduce costs in order to offset the expected ending of the bounty system.[2] A new blast furnace was added to enable the company to devote four furnaces to the production of basic pig for the steel plant, and to produce foundry pig without any interference with the steady working of the steel department. A new finishing mill, to use a large tonnage of material previously treated as scrap, was to give the company a larger output, by enlarging the varieties of the finished material it could turn out.[3]

The chief development in 1910 was the amalgamation of the Dominion Iron and Steel Company and the Dominion Coal Company into the Dominion Steel Corporation, which later secured control of the Cumberland Railway and Coal Company at Springhill, Nova Scotia. Each of these developments will be more fully discussed in another chapter. It is enough to say at present that thereby a supply of coal for a long period of time was assured, and that further economies were expected from this scheme.

In 1911 discussion centered around the question of the renewal of the bounties, or the possibility of securing protective duties; or, failing either, the possibility of reducing costs in order to keep up the measure of profits. The Dominion Steel Corporation was feeling the pressure of the competition of surplus American stock. While Mr. Plummer admitted that the bounties were no longer necessary for the general business of the company, he declared that

[1] *Annual Report*, 1909.
[2] *Statist*, vol. LXIV, p. 88.
[3] *Ibid.*, pp. 127–28.

reciprocity would end the wire-rod business and would prevent the renewal of bounties on wire rods.[1] Mr. Plummer asked for rod bounties for another year and a half, so as to allow the transition stage, during which extensions were being completed, to be tided over.

Since neither protection nor bounties seemed forthcoming, an additional new plant was installed in order to reduce costs in 1911. The annual report of 1911 declared that success in the future depended on the possibility of increasing the output. Two open-hearth mixers, with a capacity of 500 tons each, were added, to eliminate the necessity of purchasing expensive ores. A third Bessemer furnace was ready in the autumn of 1911 to assure a sufficient supply of iron and a larger output of steel per furnace; 120 coke ovens were put in full blast late in the season;[2] a new cold rolling mill and extensions to the old cold rolling mill, which was converted into a bar and rod mill, were also added.[3] The two new furnaces were started, one in 1911 and the other in 1912.[4] The company now began to produce wire, wire nails, bolts, nuts, etc., in order to offset the loss of the bounties and to insure a market and a profitable use for the output of rods. A new merchant-bar mill, for rolling all sizes of merchant bar, rivet, steel, bolt, and bar material was also installed.[5] The nail mill was operating so satisfactorily, in May, 1912,[6] that the company ordered additional machinery with the idea of ultimately consuming the entire product of the wire-rod and wire mills.[7]

The Dominion Steel Corporation, with its outstanding common stock of $35,656,800, its preferred stock of $7,000,000, preferred stock of subsidiary companies amounting to $8,000,000, and funded and mortgage debt, including that of subsidiary companies, amounting to about $25,000,000,[8]

[1] *Financial Post*, February 11, 1911, p. 1.
[2] *Monetary Times*, vol. XLVII, p. 742.
[3] *Iron Age*, vol. LXXIX, p. 101.
[4] *Monetary Times*, vol. XLIX, p. 406.
[5] *Ibid.*, vol. XLVII, p. 742.
[6] *Ibid.*, vol. XLVIII, p. 2226.
[7] *Ibid.*, vol. L, p. 292.
[8] *Annual Report*, 1912, p. 22.

is one of the largest and most important industrial enterprises in Canada. The steel plant at Sydney, the ore deposits at Wabana and elsewhere, the coal mines at Glace Bay, Cape Breton, and at Springhill, Nova Scotia, are all in a state of high efficiency under aggressive management. The company produces a wide variety of products at a good margin of profit. Mr. Plummer said, in 1912: "Our hopes for the Sydney plant are bound up with the increase of its output, partly from the profit from increased sales, but most of all from decreased costs which will result from the larger output. This will complete the work which the bounties have so far helped us to carry on.[1] We have had to exercise patience in the past and we must wait the completion of the new work before we can get large results, but your directors have the most implicit confidence in the outcome of your steel business, that there will before long be earnings sufficient to satisfy your reasonable expectations. It has taken longer to reach our goal than we expected, but the getting of a largely increased tonnage is now purely a matter of time, the market for it is assured and with these we cannot fail to secure prosperity for the plant."[2] In 1912 he reported that Canadian rail mills could supply the rail demand of Canada, at least all but an exceptional demand.[3] Apropos of the building of the United States Steel Corporation plant in Canada, Mr. Plummer said: "There is room for all of us in Canada. The Dominion Steel Corporation is not afraid of competition from the United States Steel Trust or anybody else." Mr. J. R. Wilson, vice-president, said: "One may draw his conclusions as regards competition. For instance, in buying ore the Dominion Steel Corporation pays about $1.75 per ton, while the United States Steel Corporation pays $3 to $4." Yet he admits that competition may be keenly felt in west-

[1] McCuaig's *Circular*, October 26, 1910.
[2] *Annual Report*, 1911, p. 9.
[3] *Monetary Times*, vol. XLIX, p. 356.

ern Ontario.[1] In 1913 Mr. Plummer gave assurance that the corporation was doing a very satisfactory business, and that there was no real reason for the drop in prices of the stocks of the company.[2] Evidently the future of the Dominion Steel Corporation is bright, indeed, notwithstanding the loss of the bounties.

§ 5. The establishment of an iron and steel industry at Sault Ste. Marie, Ontario, by Mr. F. H. Clergue, was the sequel to the rapid development of a power and paper plant at the same place. When experts, working on a process for saving sulphur in the production of nickel, found that the residue was an alloy of steel, so superior to anything known that the Krupps, the great German gunmakers, made a contract for a five years' supply, a reduction works and a ferro-nickel plant were immediately built. But since the percentage of nickel in the product was about 7 per cent, while the amount required for armor plates is only about $3\frac{1}{2}$ per cent, and as a deposit of iron ore was found at the now well-known Helen Mine, near Michipicoten, in 1897,[3] Clergue decided to produce iron to be used with the ferro-nickel. In this way Clergue, an American attorney, who had no knowledge of the iron and steel industry, and was associated with other enterprises not conspicuously successful, found his way into the iron and steel industry of Canada.

Mr. Clergue had unbounded imagination, initiative, and confidence. These qualities first appeared in the formation of the Consolidated Lake Superior Company in 1899, with a capital of $20,000,000 to acquire and develop already partially developed water powers, along with other industries at Sault Ste. Marie.[4] Later in the year the capital stock of the Consolidated Lake Superior Company was

[1] *Monetary Times*, vol. L, p. 139. [2] *Ibid.*, vol. LI, p. 706.
[3] *Canadian Engineer*, vol. X, pp. 15–20.
[4] *Commercial and Financial Chronicle*, vol. LXVII, p. 1075.

increased to $35,000,000 of preferred stock and $82,000,000 of common stock. This was supposed to be justified in part by a re-appraisal of the Helen Mine.[1]

By 1900 ore was being shipped from the Helen Mine to Hamilton, Midland, Ontario, and to the United States,[2] and 2000 tons a day were being mined. Since the water freight rates were low, and a 40 cent duty was levied on iron ore entering the United States,[3] there was talk of shipments to Europe. When, however, Clergue's request was granted that in all future subsidies to railways there should be a provision that the railways should use Canadian-made rails, and when in 1901 the Government gave Clergue a large order for rails at an extraordinary price, the building of a mill for the production of steel rails was immediately planned.[4]

In April, 1901, the Algoma Steel Company was formed, as a subsidiary of the Consolidated Lake Superior Company, to manufacture and trade in iron and steel and products thereof, charcoal, coke, and by-products, and to build bridges, cars, locomotives, steamships, and other structures.[5] In May contracts were let for the erection of a $10,000,000 plant.[6] Two charcoal and two coke furnaces were begun, but subsequently work on the coke furnaces was suspended.[7] A large number of men were employed in the construction of railways, ore docks and a machine shop, and in exploration.[8] New iron deposits were discovered twenty miles north of the "Soo." A charcoal plant, to supply fuel, was put up near the blast furnaces, and ovens were built to treat the by-products. It was expected that a coke plant would be erected to treat coal brought up from

[1] *Commercial and Financial Chronicle*, vol. LXXII, p. 938.
[2] *Canadian Mining Review*, vol. XX, p. 113.
[3] *Commercial and Financial Chronicle*, vol. LXXI, p. 912.
[4] Morang's *Register*, 1901, pp. 99–102.
[5] *Ibid.*, p. 39.
[6] *Monetary Times*, vol. XXXIV, p. 1513.
[7] *Canadian Mining Manual*, 1903, p. XVII.
[8] *Monetary Times*, vol. XXXV, p. 459.

ports on Lake Erie. Steel works of the most modern description, consisting of two Bessemer converters, a blooming mill, and a rail mill, were built. A railway line also was constructed from the Helen Mine to Michipicoten Harbor. The company had a fleet of steamers, which made semi-weekly trips from the Toledo district to the "Soo" and Michipicoten, carrying iron ore, coal, and pig iron.

The Bessemer steel mill was opened in February,[1] and steel rails were rolled in May, 1902.[2] The plant, thoroughly equipped in a modern way, was capable of producing daily 600 tons of Bessemer steel ingots and 100 tons of rails. Labor cost was at a minimum, because of the use of low-cost electric power on almost every machine. The mining operations of the company, yielding large profits from the mining, transportation, and sale, were probably the most encouraging.[3] Pending the completion of the blast furnaces, pig iron was purchased in the open market at low prices, chiefly from the new Midland Furnace,[4] but it was expected that the completion of the furnaces would give the company its own supply at a cost lower than market prices, especially if the bounty on pig iron were deducted from the actual cost.[5] In 1902 the Algoma Tube Works was incorporated to manufacture metallic tubes under a special patent from material to be secured from the other departments.[6]

In December, 1902, the works were suddenly closed down. Clergue had failed to secure protection for steel rails, and MacKenzie and Mann, of the Canadian Northern Railway, had bought steel rails, far below the regular price, from German manufacturers, who were said to be attempting to cut off the competition of the Canadian firm

[1] *Monetary Times*, vol. xxxv, p. 1144. [2] *Ibid.*, p. 924.
[3] *Canadian Mining Review*, vol. xxi, p. 301.
[4] *Iron and Coal Trades Review*, vol. lxiii, pp. 1409–10.
[5] *Commercial and Financial Chronicle*, vol. lxxv, p. 683.
[6] *Monetary Times*, vol. xxxv, p. 840.

by dumping their surplus output in Canada.[1] Moreover, while experts had been consulted as to the possibility of making steel rails from Helen Mine ore, it had turned out not to be Bessemer ore, and consequently ore had to be obtained from the Mesaba Range in Minnesota, and from the Josephine Mine, north of Michipicoten.[2] Open-hearth furnaces seemed necessary if the Helen Mine ore was to be used,[3] or else the ore would have to be shipped abroad in exchange for Bessemer ore.[4] Yet contracts for rails were available. The Ontario Government tendered a contract for rails for the Temiskaming and Northern Ontario Railway at $32 per ton, but the shortage of pig iron, due to the fact [5] that the blast furnaces were incomplete, forced the company to decline the contract.

It seemed absurd that the Consolidated Lake Superior Company should have to close down when $28,000,000 had been spent on plants of the best and most modern character, but it was actually impossible to find enough money during this period of financial stringency to pay off a loan of $5,050,000 to Messrs. Speyer and Company of New York.[6] In July, 1903, a plan to issue $5,000,000 of thirty-year four per cent bonds failed, owing, it is said, to efforts of capitalists connected with the United States Steel Corporation, and the plant was closed down, throwing 3500 men out of employment.[7] Arrangements were made immediately for the payment of the men through the mediation of the Ontario Government.[8]

A reorganization of the company's finances was absolutely necessary. As can easily be seen, it was grossly overcapitalized, with all expenditures made from the proceeds of the bond issues. A new company, the Lake Superior

[1] *Industrial Canada*, vol. III, p. 235.
[2] *Iron Age*, vol. LXXI, May 17, p. 9.
[3] *Ibid.*, April 16, p. 34.
[4] *Ibid.*, June 11, p. 14.
[5] *Monetary Times*, vol. XXVI, p. 1086.
[6] *Ibid.*, vol. XXXVII, p. 380.
[7] *Canadian Annual Review*, 1903, pp. 512–15.
[8] *Monetary Times*, vol. XXXVII, p. 419.

Corporation, was formed with a capital of $40,000,000 common stock, which was exchanged for the stock of the old company, in the proportion of one share of new stock for two shares of preferred and four shares of common stock of the old company. Income bonds to the amount of $3,000,000 at 5 per cent, to compensate each shareholder for the payment of $3 per share for each share exchanged, and $10,000,000 of first mortgage 5 per cent bonds, which were sold with a stock bonus of 30 per cent, were also issued.[1] Mr. Clergue was succeeded as general manager by Mr. Cornelius Shields, who had been general manager of the Dominion Iron and Steel Company.[2]

In 1904 arrangements were made for the sale of the Helen Mine ore and for the purchase of Bessemer ore in Minnesota.[3] The Josephine Mine was also tested more carefully.[4] Contracts for rails and other products began to come in, and by December nearly all departments were being fully operated.[5]

The year 1905 was one of general rejuvenation. Iron-ore mining was extensive, and railroad building was pushed forward.[6] The Lake Superior Power Company, the last to remain in the hands of the receiver, was released and came under the full control of the Lake Superior Company.[7] The car shops were reopened for the repair of freight and box cars for the Canadian Pacific, the Algoma Central, and the Temiskaming and Northern Ontario Railways.[8] There were large orders for rails — 152,000 tons in all — for the Canadian Pacific, Canadian Northern, Michigan Central, Grand Trunk, and the Intercolonial Railways.[9] Contracts were let for new open-hearth furnaces of 200 tons' capacity, each to use more Helen Mine ore.[10] As the steel-rail

[1] *Monetary Times*, vol. XXXVII, p. 1181. [2] *Ibid.*, vol. XXXVI, p. 1384.
[3] *Canadian Mining Review*, vol. XXIII, p. 143. [4] *Ibid.*, p. 100.
[5] *Monetary Times*, vol. XXXVIII, p. 714.
[6] *Iron Age*, vol. LXXV, p. 371.
[7] *Monetary Times*, vol. XXXIX, p. 474. [8] *Ibid*, p. 19.
[9] *Ibid.*, p. 53. [10] *Iron Age*, vol. LXXVI, p. 1168.

mill was using more pig iron than was produced by the charcoal furnace, the output of pig iron had to be supplemented by that of a furnace at Midland. In 1906 and 1907 the company built new coke ovens,[1] and decided to build new coke blast furnaces and steel furnaces to keep the finishing mills supplied with raw materials.[2] New records were made in the output of the steel-rail mill.[3] The year 1908 was less favorable. As railroad building was somewhat curtailed, orders for rails were not forthcoming and prices were low.[4] The company had to close down for a time, but it took the opportunity to improve the rail mill.[5] Late in the year the mill was set in operation again to fill a rush order for rails for the Grand Trunk Pacific Railway.[6] The coke blast furnaces which had just been completed were blown in.[7]

Since 1908 there has been regular and energetic development. In 1909 and 1910 control of the company passed to British and Canadian interests, and to Dr. F. S. Pearson, of New York. Additions of capital were made for the construction of plants to turn the power to more productive account.[8] Business was fairly good in 1909 and 1910,[9] and rails were sold even to the New York Central Railroad. While the rail mill was pushed to its utmost capacity,[10] the steel works received special attention. The blast furnaces were extended to keep pace with the rail mill and open-hearth furnaces.[11] As the new furnaces were designed to use Helen Mine ore, the company refused to sell the ore. A limestone quarry in Michigan was purchased and docks and ore-handling machinery were installed.[12]

[1] *Monetary Times*, vol. XL, p. 1318. [2] *Iron Age*, vol. LXXIX, p. 1732.
[3] *Monetary Times*, vol. XXXIX, p. 1324.
[4] *Iron Age*, vol. LXXXI, p. 1406. [5] *Ibid.*, p. 293.
[6] *Canadian Mining Journal*, vol. XXIX, p. 489.
[7] *Iron Age*, vol. LXXXII, p. 707.
[8] *Financial Post*, January 23, 1909, p. 11.
[9] *Ibid.*, December 24, 1910, p. 1. [10] *Ibid.*, July 30, 1910, p. 9.
[11] *Iron Age*, vol. LXXXIII, p. 1213.
[12] *Canadian Mining Journal*, vol. XXXI, p. 610.

In June, 1910, the Cannelton Collieries of West Virginia were purchased in order to make the company independent in its requirements of raw materials. Coal areas of 6000 acres were operated by the Cannelton Coal and Coke Company, whose stock is owned outright by the Lake Superior Corporation.[1] No less than 110 new by-product Koppers coke ovens were built, and the mines were worked vigorously.[2] In 1911 the Algoma Steel Corporation built an 18-inch merchant mill, a 12-inch merchant mill, to produce track fastenings, and installed many other improvements.[3] Of $10,000,000 spent between 1909 and 1911, $7,300,000 was spent on the steel branch and $3,000,000 on limestone and coal properties. The Magpie Iron Mine near Michipicoten, leased in 1909, was purchased outright in 1911.[4]

In 1911 and 1912 a 35-inch blooming mill, a 28-inch rail mill, a 350-ton tilting melting furnace for the open-hearth department, three 40-ton open-hearth furnaces, a 500-ton blast furnace, and a coal-handling plant, were added to the equipment.[5] In 1913 the company purchased sixty-three acres of land for proposed extensions, which included another blast furnace, another steel-rail mill, an open-hearth plant, coke ovens, blooming mills, and a merchant mill,[6] and storage facilities for limestone and pig iron. Additional open-hearth furnaces, the enlargement of the ore roasting plant at the Magpie Mine, and the building of a merchant mill for the production of heavy structural steel, were completed in 1914.[7]

The Lake Superior Corporation is to-day one of Canada's largest iron and steel producing companies. Besides being the first company to produce steel rails in Canada, it led

[1] *Canadian Mining Journal*, vol. xxxi, p. 477.
[2] *Iron Age*, vol. lxxxiii, p. 1213.
[3] *Ibid.*, vol. lxxxix, p. 101.
[4] *Monetary Times*, vol. xlvii, p. 1618.
[5] *Iron Age*, vol. lxxxix, p. 101.
[6] *Monetary Times*, vol. l, pp. 319 and 292.
[7] *Ibid.*, vol. li, p. 252.

in the production of other articles, such as heavy and light structural material. The company has always followed a policy of installing only the best and most up-to-date machinery; in fact, it has even taken the initiative in designing and installing machinery used nowhere else in America. The plant is operated so far as possible by electric power, of which the corporation's own power plant supplies an abundance. Altogether the works at Sault Ste. Marie are one of Canada's largest enterprises, and had it not been for the financial failures of F. H. Clergue, they would no doubt have had as great success in the past as conditions seem to warrant us in expecting in the future.

§ 6. The early development of the Hamilton Blast Furnace Company, which was well under way by 1897, has already been considered. In 1899 this company and the Ontario Rolling Mills Company were amalgamated as the Hamilton Steel and Iron Company. The finishing plant was to furnish an outlet and market for the less finished product of the other company.[1] The latter was securing the Ontario trade among foundries, and it had a market even in Quebec, as the iron produced had an excellent reputation and the Ontario and Dominion bounties were a considerable help in marketing at proper prices.[2] At first, ores from the Lake Superior district were used, but a considerable amount of ore was brought from Renfrew County, and large quantities of ore were shipped from the mine to Hamilton.[3] In 1899 about 27 per cent of the ore used was mined in Ontario.[4] The Hamilton Iron Mining Company, a subsidiary, was operating a deposit at Desbarats on the "Soo" branch of the Canadian Pacific Railway.[5] In 1899 the Equitable Mining and Developing Company was

[1] *Industrial Canada*, vol. II, p. 331.
[2] *Iron Age*, vol. LX, August 5, p. 12.
[3] Ontario, *Report of Bureau of Mines*, 1908, p. 197.
[4] *Journal of the Iron and Steel Institute*, 1900, no. 1, p. 453.
[5] *Iron and Coal Trades Review*, vol. LX, p. 1133.

formed to mine iron ores of eastern Ontario on a contract with the Hamilton Steel and Iron Company.[1]

This new company soon decided to build a large steel plant to use some of the pig iron not suitable for foundry purposes, together with scrap iron, collected throughout western Ontario.[2] Several 15-ton basic open-hearth furnaces were built in 1900. After this the concern flourished.[3] A new 250-ton blast furnace was built in 1907 to supply a large amount of iron to consumers in Hamilton.[4] The production of railway spikes, for which there was a great demand, was also begun in the same year.[5] The Hamilton Iron and Steel Company was formed to take over the properties of the old company, and the capitalization was increased from $1,513,000 to $3,000,000.[6] Since 1907 the company has extended its spike mill,[7] and has built new bolt and bar mills.[8] In 1910 $400,000 spent on a process for treating ores reduced the cost of smelting to seventy-five cents per ton.[9]

In 1910 the Steel Company of Canada was formed to amalgamate the Hamilton Iron and Steel Company with the Montreal Rolling Mills Company, the Canada Screw Company, the Dominion Wire Manufacturing Company, and the Canada Bolt and Nut Company. In 1911 the increased demands for the products of the company required the addition of machinery, equipment at various plants, a blooming mill, a rod and bar mill at Hamilton, and two more 50-ton open-hearth furnaces, which were put in operation in the autumn of 1912.[10]

In 1911 the company had to meet severe competition from the United States. Although the demand for the output was large, an abnormal amount of iron was sup-

[1] *Monetary Times*, vol. XXXII, p. 433.
[2] *Iron Age*, vol. LXII, December 15, p. 12.
[3] *Industrial Canada*, vol. II, p. 331.
[4] *Ibid.*, vol. XI, p. 815.
[5] *Ibid.*, vol. XII, p. 797.
[6] *Iron Age*, vol. LXXXI, p. 293.
[7] *Industrial Canada*, vol. IX, p. 38.
[8] *Iron Age*, vol. LXXXIV, p. 149.
[9] *Monetary Times*, vol. XLIV, p. 1114.
[10] *Ibid.*, vol. XLVIII, p. 1625.

plied by United States producers at exceptionally low prices. The price of bars was so low that only the largest plants in the United States could produce them at a cost which would give even a meager margin of profit. Prices of pig iron were still worse. As pig iron was sold below the average furnace cost, few, if any, American furnaces made money, and the prices for export to Canada were cut below those for the American market. The company also had to face conditions created by the fact that iron used for the manufacture of agricultural machinery enters Canada almost free of duty. This practically prohibited implement makers from purchasing any Canadian iron. In spite of this difficulty, the company, by selling goods at a small profit (in comparison with mills which made little or no money), was able to run the plant at full capacity and to secure the greatest economy. The improvements and additions permitted the production of bars at a cost lower than before.[1] In 1913 a wire plant, capable of producing 150 tons a day, was built at Fort William, and nail works are now being built at the same place.[2]

Of the constituent companies entering the Steel Company of Canada the second in importance was the Montreal Rolling Mills Company, a long-established firm, which owned and operated three plants in the heart of the manufacturing district of Montreal.[3] In 1903 this company, finding itself in a satisfactory condition,[4] purchased the entire properties of the Pillow-Hersey Company of Montreal for $600,000,[5] and built a new wire-nail plant with an output of 100,000 kegs of nails per year.[6] In 1906 the property of the Hodgson Iron and Tube company was purchased, and a butt weld pipe mill was constructed.[7] The company has

[1] *Annual Report*, 1912. [2] *Iron Age*, vol. xci, p. 1526.
[3] Ames's *Circular*, November 27, 1911.
[4] *Monetary Times*, vol. xxxvi, p. 1049.
[5] *Iron Age*, vol. lxxi, May 29, p. 20.
[6] *Monetary Times*, vol. xxxvii, p. 533.
[7] *Iron Age*, vol. lxxvi, p. 268.

excellent shipping facilities by rail and water and the plant and buildings are all modern and well equipped.[1]

The plant of the Canada Screw Company is located on eight acres in the center of the city of Hamilton. It has all necessary railway connections, modern buildings and equipment. The plant of the Dominion Wire Manufacturing Company, of Lachine, Quebec, a suburb of Montreal,[2] built in 1906, comprises an open-hearth furnace, a blooming mill, and a combined rod and wire mill.[3] The Canada Bolt and Nut Company, established in 1910, was a consolidation of companies owning plants in Toronto, Brantford, Belleville, and Gananoque.

All the plants of the Steel Company of Canada are modern, well equipped, and situated at strategic transportation points. The output consists of pig iron, open-hearth steel, bar iron and steel, shapes, forgings, locomotive and car wheels, bolts, nuts, rivets, horseshoes, wrought-iron pipe and fittings, wire and cut nails, tacks and screws, wire, etc. With the exceedingly efficient management not only of the general enterprise, but also of the various branches, the future of the company seems assured.[4]

§ 7. Another important advance was made in the Canadian iron industry by the Drummond interests of Montreal when, in 1899, the Canada Iron Furnace Company accepted Midland's offer of $50,000, along with ten years of tax exemption, if the company would build a blast furnace at Midland. Midland was regarded as a good site, since it had the best harbor on Georgian Bay, where ore can be secured at low cost from Hastings County or by water from Lake Superior ore mines, such as the Helen Mine.[5] The capital of the Canadian Iron Furnace Com-

[1] Ames's *Circular*, November 27, 1911.
[2] *Ibid.*
[3] *Monctary Times*, vol. XL, p. 195.
[4] Ames's *Circular*, November 27, 1911.
[5] *Iron Age*, vol. LXIII, February 23, p. 15.

pany was increased from $300,000 to $1,000,000.[1] A furnace of 125 tons' daily capacity was built on a splendid water-front property opposite the town. Docks were fitted up with modern ore elevators to deliver materials directly to the stock house.[2]

It had been the original intention of the company to manufacture charcoal iron, to be used in the manufacture of car wheels in the works controlled by those interested in the Canadian Iron Furnace Company,[3] but cordwood rose so rapidly in price that the management soon decided to purchase Connellsville coke as fuel. A large quantity of the Helen Mine ore was used for some years, but more recently the product has been Bessemer iron made from ore secured from the Lake Superior region, the Mineral Iron Range Mining Company at Bessemer, Hastings County,[4] and from the Radnor Mine, Renfrew County, Ontario.[5] For the time prospects looked so bright that in 1909 to 1910 a new 250-ton blast furnace was built at Midland,[6] but the company has since got into financial difficulty, due partially to the second furnace overreaching opportunities.

The second venture of the Drummond interests was the purchase of the plant of the Londonderry Iron Company in 1902. The Londonderry works had been closed down[7] in 1898 because modern discoveries and inventions had rendered the plant obsolete, and it was no longer profitable to carry on the works in their old form.[8] In 1899 the plant, including mineral lands, blast furnaces, a rolling mill, foundries, coke ovens, a railway and rolling stock, machinery, and the Chignecto Colliery at Maccan were sold to

[1] *Monetary Times*, vol. XXXIV, p. 360.
[2] *Industrial Canada*, vol. LI, p. 339.
[3] *Iron Age*, vol. LXXIII, February 23, p. 15.
[4] Ontario, *Report of Bureau of Mines*, 1908, pp. 197–98.
[5] Jeans, *op. cit.*, p. 108.
[6] *Canadian Mining Journal*, vol. XXXI, p. 610.
[7] *Ibid.*, vol. XVIII, p. 56.
[8] *Monetary Times*, vol. XXXIII, p. 618.

Mr. H. S. Holt for $153,000.[1] Meanwhile the foundry was operated by Drummond, McCall and Company, for the manufacture of water pipe. As the Drummond people were looking for a suitable site in Nova Scotia for such a foundry, they decided to purchase the whole plant,[2] and in 1902 formed the Londonderry Iron and Mining Company to acquire these properties and to enter upon the manufacture of a high-grade foundry pig iron.[3]

In 1903 the plant was remodeled and placed in first-class shape.[4] One furnace was completely rebuilt.[5] An excellent laboratory, repair shops, car shops, machine room, blacksmith forge, office buildings,[6] and a new casting house were added, and the cold blowing engines were fully repaired. The second and smaller furnace was pulled down.[7]

In 1904 the furnace was put in operation,[8] and ore deposits at Torbrook were purchased and shipments to Londonderry begun.[9] As a mixture of local and Torbrook ore is reasonably free of phosphorus and sulphur, and as the Torbrook red hematites often contain enough limestone to be self-fluxing, the combination produced splendid foundry iron.[10] In 1905 a new company, the Annapolis Iron Mining Company, was incorporated to operate the Torbrook Mines, and sell the output to the Londonderry company. Practically the same interests were concerned in the two companies.[11]

The furnace and plant were out of operation late in 1907, owing to the lack of supply of coke and the cutting of

[1] *Monetary Times*, vol. XXXIII, p. 618.
[2] *Iron Age*, vol. LXX, October 2, p. 16.
[3] Canada, *Report on Mining and Metallurgical Industries*, p. 427.
[4] *Monetary Times*, vol. XXXVI, p. 427.
[5] *Canadian Mining Manual*, 1903, p. 47.
[6] *Canadian Mining Journal*, vol. XXVIII, p. 71.
[7] *Ibid.*
[8] *Monetary Times*, vol. XXXVII, p. 903.
[9] *Canadian Mining Review*, vol. XXIII, p. 204.
[10] *Ibid.*, vol. XXVIII, p. 72.
[11] Canada, *Report of Mining and Metallurgical Industries*, pp. 524–26.

prices in pig iron,[1] but the foundry operations were renewed in 1909.[2] In 1909 the furnace using some ore from Bathurst, New Brunswick, was started up again.[3] The Drummond people had, in the mean time, developed the iron mines in Gloucester County, near Bathurst, by installing a plant to raise 2000 tons per day, and by building a railway connecting the mines with the Intercolonial Railway at Newcastle.[4] Since a deposit of coal was found near the mines,[5] the erection of a blast furnace at Bathurst was discussed.[6] The ore beds were mined and contracts were made for the shipment of 60,000 tons in 1912, and 200,000 tons in 1913, to Philadelphia. In 1912 $100,000 was spent on a large concentrator of 700 tons' capacity, an ore-crushing plant, engines, and a stock-piling equipment.[7]

Since 1910 the Londonderry Furnace has not been in operation,[8] but the company developed its Torbrook Mines by installing mining and crushing machinery and by building shipping docks for this ore at Port Wade, Nova Scotia, with leading facilities of 2000 tons per hour. The Torbrook Mines were closed down in 1911, but ore from the stock pile was concentrated and cargoes shipped as prices improved,[9] and the mines were reopened in 1912.[10]

Meanwhile, the Drummonds and allied interests were involved in several other projects. The Canadian Iron and Foundry Company had operated car-wheel shops and pipe foundries at St. Thomas and Hamilton, Ontario, at Londonderry, Nova Scotia, and at Montreal and Three Rivers,

[1] *Canadian Mining Journal*, vol. XXIX, p. 96.
[2] *Industrial Canada*, vol. VIII, p. 713.
[3] *Canadian Mining Journal*, vol. XXIX, p. 638.
[4] *Ibid.*, vol. XXVIII, p. 540.
[5] *Monetary Times*, vol. XLIV, p. 1015.
[6] *Industrial Canada*, vol. VIII, p. 624.
[7] New Brunswick, *Report of Crown Land Department*, 1912, pp. xxiv–xxvii.
[8] *Monetary Times*, vol. XLIX, p. 110.
[9] *Canadian Mining Journal*, vol. XXXII, p. 48.
[10] Nova Scotia, *Report of Department of Mines*, 1912, pp. 173–74.

Quebec.[1] A pipe foundry and car-wheel shop had been built at Fort William to take care of the western business in piping and car wheels.[2] This plant was extended in 1912 to permit the manufacture of more car wheels for the new Port Arthur plant of the Canadian Car and Foundry Company.[3] In 1912 the plant at Three Rivers was entirely rebuilt to manufacture seventy-five tons of water pipe and twenty-five tons of castings per day.[4]

The Radnor Furnace at Radnor Forges, Quebec, was in blast until 1911. Charcoal was produced at ovens at Radnor Forges and Grand Piles, Quebec. John McDougall and Company, allied interests, have operated a furnace at Drummondville, Quebec. Only charcoal iron has been made by these small Quebec furnaces. The output has been sold to the Canadian Pacific Railway, the Rhodes Curry Company, and the Canada Iron and Foundry Company for the manufacture of car wheels and cast-iron pipe.[5]

In 1908 practically all these plants were purchased by the Canada Iron Corporation. In 1912 this new corporation reported that "the business of the iron foundries shows a constant and very healthy growth and, despite the effects of American competition on the profits of 1911 to 1912, a yearly tonnage production is now obtained from all departments that insures a *permanent supremacy* of the corporation in its special field of operation from foundry pig iron to the finished product of railway and tramway car wheels, cast-iron water pipe and gas pipes, and general castings. The demand for this corporation's products is increasing daily, neccssitating still further extensions to plants, especially at western points, to enable pace being kept with the general expansion of the country. The corporation occupies a position to cope with and take advan-

[1] *Monetary Times*, vol. XLI, p. 2125.
[2] *Iron Age*, vol. LXXX, p. 367.
[3] *Ibid.*, vol. XC, p. 228.
[4] *Canadian Mining Journal*, vol. XXXII, p. 148.
[5] Canada, *Report on Mining and Metallurgical Industries*, pp. 472–73.

tage of the growing trade of Canada." [1] Nevertheless, the heavy bonded debt of the Canada Iron Corporation forced it into insolvency in 1913, and most of the plants have been closed down pending reorganization.

§ 8. One of the best-known steel firms in Canada during the past decade and a half is the Montreal Steel Works, which, in 1913, was the largest producer of steel castings in Canada.[2] As we have seen, this company had been established as early as 1883.[3] The business went on very successfully, sales were almost always good, earnings were high, dividends were satisfactorily paid from time to time, and a considerable surplus was piled up. The depression of 1907 to 1908 was a somewhat adverse factor, but not altogether dangerous.[4] In 1911 the plant consisted of two basic open-hearth furnaces manufacturing thirty tons of steel daily from British pig iron, Canadian scrap iron, and some Lake Superior ore.[5] In 1912 a modern steel-castings plant was built at Longue Point, Montreal, to increase the output of steel castings for the Canadian Car and Foundry Company,[6] as well as for the general market of the country.[7]

In 1906 the Ontario Iron and Steel Company was incorporated with a capital of $500,000 to build a steel-castings plant and rolling mill at Welland, Ontario, where natural gas, electric power, and good transportation facilities are obtainable.[8] A plant, including basic open-hearth furnaces, rolling mills, and a small steel foundry to produce steel castings, rails, bars, angles, skelp, etc., from pig iron bought on the open market, was built in the years 1907 to 1908.[9] In 1911 the Montreal Steel Works and the Ontario

[1] *Annual Report*, 1912. [2] *Monetary Times*, vol. XLVIII, p. 2626.
[3] Canada, *Report on Mining and Metallurgical Industries*, p. 493.
[4] *Financial Post*, July 3, 1909, p. 8.
[5] Canada, *Report on Mining and Metallurgical Industries*, p. 463.
[6] *Monetary Times*, vol. XLVIII, p. 2626. [7] *Ibid.*, vol. XIV, p. 837.
[8] Canada, *Report on Mining and Metallurgical Industries*, pp. 335–36.
[9] Ontario, *Report of Bureau of Mines*, 1908, p. 199.

Iron and Steel Company were amalgamated as the Canadian Steel Foundries.

Each of these companies had made sales to the increasing number of car-building firms in Canada. The rapid expansion of car building, following the increase of traffic and the expansion of Canada's railway net, involved a large demand for steel castings and car wheels. When, therefore, the Canada Car and Foundry Company was formed to amalgamate the Dominion Car Company, the Canada Car Company, and the Rhodes Curry Company, which concerns together produced in 1909 no less than 85 per cent of the cars built in Canada, it secured control of the Canadian Steel Foundries mentioned above. Thus, the Canada Car and Foundry Company consists of an important finishing industry and a successful company producing primary products.

§ 9. Besides these more important iron and steel enterprises, we must consider the operations of Sir William MacKenzie and Sir Donald Mann, in mining iron ore at Atikokan, west of Port Arthur, and in manufacturing iron products in Port Arthur.[1] Port Arthur agreed to subscribe to $200,000 worth of bonds of the Atikokan Iron Company, to provide it with a free site of forty acres, worth $25,000, to give it a twenty-year tax exemption, to close certain streets, and to give a free right of way for a Canadian Northern Railway spur track. In return, it was to have a representative on the board of directors, and the head office was to be at Port Arthur.[2] This new iron company was supplemented by another company, the Canadian Coal and Ore Dock Company, which built coal and ore docks capable of storing 200,000 tons of coal and 100,000 tons of ore.[3]

In 1906 to 1907 the blast furnace and other parts of the

[1] *Iron Age*, vol. LXVII, May 30, p. 15. [2] *Ibid.*, vol. LXXV, p. 317.
[3] *Monetary Times*, vol. XXXVIII, p. 1151.

plant were built. The mine was equipped with high-class machinery, and connected with the Canadian Northern Railway by a six-mile spur line.[1] Since the ore was somewhat sulphurous and needed roasting, a roasting furnace was added.[2] The installation of the blast furnace at Port Arthur was very costly because a large portion of the cost was sunk in securing a suitable foundation for docks, coke ovens, and the furnace. The point chosen for building was low and marshy, really a deposit of a great depth of alluvial mud, carried down by the Kaministikwia River. The company decided to construct its plant over the bay rather than dredge a channel to their docks.[3] One hundred coke ovens were built on a pier running out to deep water.

In September, 1907, the furnace was put in operation,[4] and in November 2000 tons of pig iron were shipped to Sault Ste. Marie.[5] Satisfactory results were obtained from the furnace, which produced 100 tons of excellent pig iron per day from Canadian ore.[6]

Since the industrial depression of 1907 to 1908 fell with special weight on most of the iron and steel interests, the Atikokan Company had entered on its production at a most unfortunate time. Instead of piling up stocks of pig iron, the company closed down the plant until conditions should be less adverse.[7] It had been expected that the works would start up in 1908, but as time passed on without the renewal of operations, and as fixed charges could not be met, MacKenzie and Mann asked for a winding-up order,[8] which was withdrawn when the shareholders got sufficient capital to pay the claims.[9]

Under the new management[10] of J. D. Fraser, of the

[1] *Monetary Times*, vol. xxxix, p. 982.
[2] Ontario, *Report of Bureau of Mines*, 1908, p. 69.
[3] *Industrial Canada*, vol. viii, p. 95.
[4] *Ibid.*
[5] *Iron Age*, vol. lxxx, p. 1403.
[6] *Ibid.*, p. 699.
[7] *Ibid.*, vol. lxxxi, p. 845.
[8] *Ibid.*, vol. lxxxii, p. 774.
[9] *Ibid.*, vol. lxxxv, p. 291.
[10] Ontario, *Report of Bureau of Mines*, 1909, p. 84.

Dominion Iron and Steel Company,[1] the iron plant was considerably overhauled after eighteen months of disuse and many improvements were installed.[2] With prices for iron favorable and orders coming in,[3] the plant was reopened in August, 1909.[4] In 1910 more ore was roasted than was used, and some of it was sold.[5] In 1911 a large cast-iron pipe and car-wheel foundry was added to employ much of the pig iron produced at the furnace, and the enlargement of the furnace or the building of a second blast furnace was seriously considered.[6] In 1913 the firm decided to build a wedge-type roasting furnace.[7] As early as 1906 the erection of steel works was contemplated,[8] and in 1912 there was talk of a $5,000,000 steel plant including blast furnaces, rolling mills, steel-rail mills, merchant mills, bar mills, ore and coal docks, etc., evidently to make use of ore from both the Atikokan Range and the Moose Mountain Range, but as yet nothing of this nature has been accomplished.[9]

In 1905 the vast deposits of iron ore at Moose Mountain, Ontario, amounting to some 100,000,000 tons of fair quality magnetite, low in phosphorus, and of excellent furnace texture,[10] were sold to MacKenzie and Mann and American interests.[11] Since the Canadian Northern Railway gave a direct connection with Lake Huron or Georgian Bay, some eighty miles away, the likelihood of profitable results from mining seemed good. Iron ore could be shipped cheaply to the Lake; the water route to Lake Erie would be shorter than from Minnesota, and the navigation of the "Soo" locks would be avoided.[12]

[1] *Canadian Mining Journal*, vol. xxx, p. 45.
[2] *Iron Age*, vol. lxxxiv, p. 277.
[3] *Canadian Mining Journal*, vol. xxx.
[4] *Iron Age*, vol. lxxxiii, p. 491.
[5] *Canadian Mining Journal*, vol. xxxi, p. 234.
[6] *Iron Age*, vol. lxxxvi, p. 1138.
[7] *Ibid.*, vol. xc, p. 1339.
[8] *Ibid.*, vol. lxxvi, p. 1168.
[9] *Canadian Engineer*, vol. xx, p. 332.
[10] *Mineral Industry*, 1911, p. 398.
[11] *Iron Age*, vol. lxxx, p. 1150.
[12] Canada, *Report on Mining and Metallurgical Industries*, p. 318.

Before shipment to the United States was finally decided upon, MacKenzie and Mann made Toronto a proposal to build a steel plant at that city. In 1907 they stated that they would like to smelt 1200 tons [1] of Moose Mountain ore at Toronto daily, provided that 350 acres of Ashbridge's Marsh, which was regarded as a suitable location for the plant, convenient for laying down coal or coke,[2] were granted them.[3] They proposed to build blast furnaces of large capacity, steel mills, and mills for the manufacture of billets, rolled plates, bar iron, and other products for export.[4] Because of the refusal of the city to grant the area demanded, and other adverse factors, such as money stringency and industrial depression,[5] the project for a steel plant in Toronto was abandoned, and the ore was shipped to the United States.[6]

§ 10. The same duty that had hampered the shipment of coal from Nova Scotia to New England after 1897 applied also to charcoal, and the Rathburn people of Deseronto, who had previously been shipping charcoal to Detroit, found that they could no longer sell profitably in the Detroit market, and as a result seventeen large kilns were idle.[7] Therefore, in 1898 a blast furnace was built at Deseronto for the manufacture of charcoal iron.[8] It was put in operation in 1899,[9] and was continually in blast until 1902. Charcoal was supplied from the Rathburn kilns and retorts at Deseronto.[10] Ores from Lake Superior districts and from Bessemer, Ontario, were used. Fluxing materials from the Bay of Quinte Railway quarries were available

[1] Ontario, *Report of Bureau of Mines*, 1908, p. 199.
[2] *Iron Age*, vol. LXXVIII, p. 1014.
[3] *Canadian Mining Journal*, vol. XXVIII, p. 482.
[4] *Iron Age*, vol. LXXX, p. 1085.
[5] *Ibid.*, vol. LXXXI, p. 323.
[6] *Canadian Engineer*, vol. XVII, p. 43.
[7] *Iron Age*, vol. LX, September 9, p. 8.
[8] *Canadian Engineer*, vol. VI, p. 285.
[9] Canada, *Report on Mining and Metallurgical Industries*, pp. 321–22.
[10] *Industrial Canada*, vol. II, p. 333.

at low cost.[1] The iron was used almost entirely for the manufacture of malleable castings and car wheels and for general foundry work, where exceptional strength and density are required. Some of it has been sold on the Continent and in Great Britain.[2]

In 1906 the company found increasing difficulty in getting wood at reasonable prices. The blast furnace had to be closed down until some repairs had been made and the plant somewhat enlarged to permit the use of coke as fuel.[3] Since hardwood limits were soon secured in Hastings County [4] and since the furnace was modeled on charcoal furnace principles, charcoal has been used most of the time. A special low sulphur coke from the Connellsville district has, however, been used on occasion.[5] In 1911, a year of low prices, the company had no difficulty in marketing its small production; since charcoal iron always commands a good price and has a ready sale.[6]

§ 11. Ferro-products and pig iron and steel have been produced in Canada by electrical processes in more recent years. The possibility of economically producing steel and iron by this method has been a matter of recent discussion and experiment, and the process is still in the experimental stage.

In 1907 the Electro-Metals Company of Welland, Ontario, was formed[7] to manufacture pig iron, high-grade steel and steel castings, and ferro-products in a 3000 horsepower furnace using power furnished by the Ontario Power Company.[8] The electric furnace at the "Soo" has not been regularly in operation since the trial tests in 1907. In that year the Electric Furnace Products Company of

[1] *Iron Age*, vol. LX, September 9, p. 285.
[2] *Industrial Canada*, vol. II, p. 333.
[3] Ontario, *Report of Bureau of Mines*, 1908, p. 197.
[4] *Iron Age*, vol. LXXIX, p. 1582.
[5] Ontario, *Report of the Bureau of Mines*, 1908, p. 314.
[6] Personal Correspondence.
[7] *Iron Age*, vol. LXXIX, p. 1061. [8] *Ibid.*, p. 1665.

Pittsburg secured the promise of a ten-year tax exemption, and a fixed assessment of $25,000 for a further ten years, from Chippewa, Ontario, and purchased nineteen acres and promised to build a $50,000 plant for the manufacture of structural steel.[1] In 1909 the Electric Steel Company was formed to establish a steel plant at Welland.[2] In 1904 Mr. J. E. Evans, of Belleville, had begun to experiment on the use of the titaniferous iron ores of Canada, and devised an electric furnace to produce tool steel of distinctly superior character. In 1909 Dr. Stansfield, of McGill University, formed a partnership with Mr. Evans, whose process, when improved, was called the Evans-Stansfield Direct Electric Smelting Process. A furnace was built at McGill University with a daily capacity of one half ton of steel. This provides for the direct manufacture of tool steel from previously useless titaniferous ores, which comprise more than half of the known Canadian ores.[3] In 1913 the Moffat Irving Steel Works of Toronto were built to produce steel castings by electric process.[4]

Most of the electric companies produce chiefly ferro-products, such as ferro-silicon, ferro-phosphorus, and ferro-titanium. All of these are being made by the Electric Reduction Company of Buckingham, Quebec. Ferro-silicon and ferro-titanium have been made at Welland. In 1912, 7834 short tons of ferro-products constituted the output of electric furnace plants. In the calendar year 1912 the imports of ferro-products were 19,810 tons, worth $469,884.[5] The Welland plants probably produce at a higher cost than American plants. Indeed, in the face of the duty of $2.50 on ferro-products, American firms are able either to undersell Canadians or to force them to sell at most discouraging prices.[6]

[1] *Iron Age*, vol. LXXXIV, p. 991. [2] *Industrial Canada*, vol. X, p. 16.
[3] *Canadian Mining Journal*, vol. XXXII, pp. 591–92.
[4] *Iron Age*, vol. XCIII, p. 132.
[5] Canada, *Production of Iron and Steel in Canada*, 1912, p. 22.
[6] United States, *Tariff Hearings*, 1909, p. 1480.

§ 12. Something has been said from time to time about the possibility of producing iron in British Columbia. The demand for manufactured iron in British Columbia is rapidly increasing, and high prices, due to the heavy freight charges from Eastern points and Great Britain, have frequently raised the question. The ore supplies on the coast are sufficient for an iron industry, and a good quality of pig iron could be produced.[1] A small blast furnace, erected in 1880 at Irondale, in the State of Washington, was operated till 1891. When, in 1901, the Pacific Steel Company was organized to acquire and operate this furnace, it was modernized by an expenditure of about $100,000. Ores from Texada Island and from Hamilton, Washington, were used. The Texada ores had to be roasted to get rid of sulphur, so the project did not meet with success and was closed down [2] until 1911, when operations were revived.[3]

In 1909 the Washington Steel Company was incorporated to acquire coal properties in British Columbia, and to build blast furnaces and rolling mills north of Seattle.[4] After inspecting the Vancouver Island deposits in 1907, Mr. J. S. Bradford, an English iron master, tried to organize the Northern Pacific Iron and Steel Company, and proposed the building of open-hearth steel furnaces, blast furnaces, blooming mills, tin-plate mills, a cast-iron pipe foundry, iron tube works, a bar mill, and later ship-plate and rail mills.[5] In 1911 the British Columbia Steel Company was formed, with a capital of $10,000,000, to build a large steel plant near Vancouver.[6] The only practical results of these suggestions have been the addition of a steel foundry converter to the plant of the Vancouver Engineering Works in 1909, the only Canadian steel furnace west of the Great Lakes. The foundry produces a small but

[1] *Monetary Times*, vol. XLIV, p. 1414.
[2] Lindeman, *op. cit.*, p. 7.
[3] *Monetary Times*, vol. XLVII, p. 845.
[4] *Ibid.*, p. 845.
[5] *Iron Age*, vol. LXXX, p. 656,
[6] *Monetary Times*, vol. XLVI, p. 1030.

steady supply of heavy steel castings which cannot be cheaply transported to western Canada.[1]

The truth of the matter seems to be that, while there are ores and coal and fluxing materials in British Columbia, the present price of coke on the coast (from $7 to $8 per ton, with little likelihood of its being less while the present price of coal continues) does not seem to justify the expectation that an iron-smelting industry will develop in the near future. Electric smelting on a large scale is not an immediate prospect, since the process has not been perfected sufficiently to be economically feasible. A British Columbia industry is, then, merely a possibility of the future.[2]

§ 13. Much of the imported iron and steel products have come, of recent years, from the United States. Hence it has been natural to expect that a Canadian plant should be built by the United States Steel Corporation, and this suggestion was early discussed. In 1904 certain advantages of such a scheme were set forth. Canada at that time offered bounties on pig iron and steel billets and certain iron and steel products, whether or not such products were consumed in Canada. In addition, the duties on bar iron and other iron and steel products, especially steel rails, were rather onerous to outsiders, but ore and coking coal entered Canada free or at a low rate of duty. Port Colborne, on the north shore of Lake Erie, at a point near the Welland Canal,[3] was the location suggested. By 1906 the United States Steel Corporation had acquired lands near Sandwich, opposite Detroit, and the construction of a $10,000,000 plant was expected;[4] but in preference to building the company opened a branch office in Toronto in 1911 and since then has been doing a large business,

[1] *Industrial Canada*, vol. x, p. 775.
[2] British Columbia, *Report of Minister of Mines*, 1912, p. 27.
[3] *Monetary Times*, vol. xxvii, p. 39. [4] *Ibid.*, vol. xxxix, p. 923.

especially in lines on which the duties are low.[1] Such articles as triangular mesh concrete reinforcement, structural steel, shapes, bars, rods, sheet steel, steel pipe, wire rope, and nails have found a favorable market.[2]

At the annual meeting of the directors of the United States Steel Corporation at New York on December 31, 1912, the company decided to build a $20,000,000 plant at Sandwich, to manufacture practically all classes of steel, wire, rails, structural and bar steel, tin plate, tubing, nails, pig iron, and steel billets. Building operations have since then been postponed, pending tariff legislation in either Canada or the United States, or both.

§ 14. It seems practically impossible satisfactorily to cover the miscellaneous undertakings in the manufacture of iron and steel products in Canada. Yet a large number of firms carry on a more or less successful business in special branches. Between 1891 and 1910 the number of plants producing "iron and steel products" increased from twenty-nine in 1890 and 1900 to eighty-nine in 1910. The products increased in value from about $4,000,000 in 1890, to about $7,000,000 in 1900, and to over $34,000,000 in 1910. Although the number of foundries and machine shops did not expand, their products increased in value from $17,000,000 in 1890, and $15,000,000 in 1900, to over $45,000,000 in 1911. Bridge-building and the production of wire fencing have also prospered.[3] In the calendar year 1910 the total production of iron and steel products amounted to $113,000,000 as compared with $30,000,000 in 1890 and 1900.[4]

Some attempts have come to unhappy endings and other efforts have been reorganized and redirected. Some of these are sufficiently important to warrant discussion. In 1901 the Cramp Ontario Steel Company was formed to

[1] *Monetary Times*, vol. XLVII, p. 843.
[2] *Ibid.*, vol. XXX, p. 139.
[3] See Appendix C, Table I.
[4] *Ibid.*, Table II.

build at Collingwood a blast furnace, steel furnaces, and rolling mills, to produce pig iron, steel ingots, plates, structural steel, rails, and rods. Collingwood was chosen as the site of the proposed plant because it had shipping advantages by which ore and coal could be cheaply assembled, and the product cheaply marketed, especially in the Northwest, and because it offered a bonus of $115,000 and exemption of part of the property from taxation.[1] Ore was to be procured from the Helen Mine.[2] Machine shops, a forge, power works, a merchant-bar mill, rolling mills and heating furnaces, a guide mill, and an open-hearth plant were built in 1902.[3] The blast furnace was omitted from the list temporarily, so that large stocks of pig iron would not be accumulated.[4] Rods, a special product of the company, were to be sold to the Imperial Steel and Wire Company, whose plant was adjacent to that of the steel company.

Neither the rolling mills nor the open-hearth furnace ever saw hot steel, because the company got into financial difficulties in 1903.[5] In 1904 it was relieved of its obligation to build the blast furnace until the steel plant should be fully established, on condition that the town could reduce its bonus from $115,000 to $60,000.[6] In the same year the company, which had been sued for a note of $52,600,[7] was reorganized as the Northern Iron and Steel Company.[8] The new company was to install a plant to make rolled wire rods, bolts, nuts, angles,[9] and such other shapes and materials as the market demanded.[10] Operations were

[1] *Iron Age*, vol. LXVII, January 10, p. 21.
[2] Morang's *Register*, 1901, p. 91.
[3] *Iron Age*, vol. LXX, October 30, p. 9.
[4] *Ibid.*, vol. LXXII, September 10, p. 20.
[5] Ontario, *Report of Bureau of Mines*, 1908, p. 198.
[6] *Monetary Times*, vol. XXXVII, p. 1127.
[7] *Commercial and Financial Chronicle*, vol. LXXVII, p. 2342.
[8] *Ibid.*, vol. LXXIX, p. 215.
[9] *Monetary Times*, vol. XXXVIII, p. 835.
[10] *Industrial Canada*, vol. V, p. 442.

begun in 1906,[1] but in 1908 the Northern Iron and Steel Company also found itself in financial difficulty.[2]

Meanwhile, the Imperial Steel and Wire Company of Collingwood, whose directors were the same as the directors of the Cramp Steel Company,[3] had been formed in 1904 to manufacture wire rods, wire and wire nails, wood screws and wire fencing, at a time when there was a large importation of such articles.[4] In 1906 the plant was enlarged from a capacity of from fifteen to fifty tons per day.[5] Since then the business has been flourishing, and the company declared a twenty per cent stock dividend in 1912.[6] So far as can be understood, the Northern Iron and Steel Company's business has been carried on in conjunction with that of the Imperial Steel and Wire Company.

In 1905 the Canada Tin Plate and Sheet Steel Company was granted the right to develop 1100 horse-power from the Williamsburg Canal. It was also asking the town of Brockville for land worth $2250, free water, tax exemption, and the right to run a railway track to the St. Lawrence River. The company agreed to erect mills, to employ 400 men, and to buy the surplus electric power of the town.[7] Building was started in May, 1905. It is said that the company had expected tariff protection, but as we have seen, the users of tin plate and sheet steel successfully objected to the increase of the duties on such raw materials.[8] Welsh and American competition was severely felt, but an appeal made for the application of the Dumping Act[9] was only temporarily granted.[10] In 1909 the company got into financial difficulties, and was reorganized as the Canadian Sheet

[1] *Monetary Times*, vol. XL, p. 460.
[2] *Commercial and Financial Chronicle*, vol. LXXXVI, p. 484.
[3] *Ibid.*, vol. LXXIX, p. 1025.
[4] *Monetary Times*, vol. XXXVII, p. 375.
[5] *Ibid.*, vol. XXXIX, p. 186.
[6] *Ibid.*, vol. XLIX, p. 108.
[7] *Ibid.*, vol. XXXVIII, p. 1225.
[8] *Hardware and Metal*, vol. XVII, February 5, 1910, p. 44.
[9] *Iron Age*, vol. LXXXV, p. 280.
[10] *Ibid.*, vol. LXXXIV, p. 434.

Steel Corporation to manufacture [1] black and galvanized sheets, for which there was a good market — one better than for tin plate.[2]

Of like character has been the rolling-mills project for Belleville, Ontario. In 1898 the Abbot-Mitchell Iron Company was formed to make pig iron, bar iron, puddled bar, and Bessemer steel at Belleville.[3] The company decided to carry on the work of rolling mills at first,[4] and built a plant, including a spike and nail factory in 1899, but for some reason or other the company failed, and in 1901 the plant was sold at auction.[5] In 1902 the Belleville Rolling Mills Company was formed to operate the works,[6] but they were soon closed down again and part of the product and the fuel were sold for taxes.[7] In 1906 the nail-making machines were removed and machinery to manufacture horseshoes was installed.[8] The plant now belongs to the Steel Company of Canada.

Elsewhere more success attended various ventures. Most rolling mills in existence in 1897 have since made extensions to their plants.[9] Sydney has become the center of a considerable iron and steel industry, attracted largely by the presence of the plant of the Dominion Steel Corporation.[10] Many new establishments have been planned and

[1] *Monetary Times*, vol. XLII, p. 2028. [2] *Iron Age*, vol. LXXXV, p. 289.
[3] *Monetary Times*, vol. XXXII, p. 1090.
[4] *Iron Age*, vol. LXIII, February 23, p. 15.
[5] *Monetary Times*, vol. XXXIV, p. 1306. [6] *Ibid.*, p. 1596.
[7] *Ibid.*, vol. XXXVIII, p. 502. [8] *Ibid.*, vol. XL, p. 127.

[9] In 1899 the Maritime Nail Company extended its works at St. John, doubling the output, and in 1913 it built a nail factory at Fort William. In 1904 the plant was burned down, and Sydney, Nova Scotia, bid for the business. Machinery was reinstalled in 1906, and in 1907 the Capewell Horse-Nail Company of Hartford, Connecticut, took over a controlling interest. In 1906 James Pender and Company, of St. John, extended their plant, and the Peck Rolling Mills Company, of Montreal, followed the same policy.

[10] In 1903 the Dominion Tar and Chemical Company established a plant at Sydney to distill various chemical products from the Dominion Iron and Steel Company's coke ovens. The Sydney Cement Company was formed to use the slag from the furnaces for the manufacture of a

built. Of these the most important may be mentioned. Pig iron has been produced by William Frankel, of Toronto.[1] The furnace of the Pictou Charcoal Iron Company was leased to the Mineral Products Company of Hillsboro, New Brunswick, in 1897,[2] but has not been worked since 1899.[3] William Kennedy and Sons, of Owen Sound, Ontario, have produced steel billets and steel castings.[4] In 1913 a blast furnace, capable of producing 300 to 350 tons of malleable and Bessemer pig iron daily, was built by the Buffalo Union Furnace Company at Port Colborne, Ontario. This is apparently destined to become one of the more important iron plants of Canada.[5]

well-known brand of cement. In 1904 the Cape Breton Iron and Steel Company established at Sydney an iron foundry, costing $250,000, to produce iron and steel castings, especially for marine work. In 1905 a large stove and foundry company built a wire-nail plant. Other firms have negotiated with the town from time to time.

[1] *Canadian Trade Index*, 1910.

[2] *Canadian Mining Manual*, 1896, p. 146.

[3] *Iron Age*, vol. LXX, February 26, p. 21.

[4] *Canadian Mining Journal*, vol. XXXI, p. 208.

[5] *Iron Age*, vol. XCI, p. 1205.

In 1903 the London (Ontario) Rolling Mills were put in operation, and the Ottawa Steel Castings Company was formed to manufacture steel castings under special patents. In 1906 the Royal Screw Company was formed to manufacture screws, bolts, nuts, and tools at Montreal; the American Horseshoe Company built a plant near the Hamilton Smelting Works; the Toronto Pressed Steel Company completed a plant to manufacture railway and contractors' supplies; the Continuous Steel Rail Company began to manufacture steel rails, car wheels, and railway supplies at Toronto; a branch factory of the Union Drawn Steel Company of Pennsylvania was established at Hamilton to manufacture polished steel shafting, finishings, forgings, and castings; the Ingersoll Nut Company built a plant at Ingersoll; the Canadian Shovel and Tool Company was incorporated to make spades and mechanics' tools at Hamilton; at Peterboro a shovel and tool company began operations; the Manitoba Rolling Mills Company was formed to build a plant at Winnipeg; a malleable iron foundry was built at Brockville; and a structural steel plant was established at Walkerville, Ontario. In 1907 a car-wheel foundry was established at Londonderry, Nova Scotia, and the Structural Steel Company of Canada was empowered to carry on bridge-building and other iron and steel work. In 1909 the Provincial Steel Company was formed with a capital of $250,000, and began to re-roll rails. In 1910 the Superior Roll-

§ 15. This detailed discussion of the development of the various establishments, together with the statistics of growth previously presented, make very evident the rapid advance of the Canadian iron and steel industry in recent years. A few features of this progress are, however, of particular interest.

In the first place, the greatest developments have occurred in the primary industry in the Provinces of Ontario and Nova Scotia.[1] The output in Quebec has dropped from 11,121 tons in 1904 to 658 tons in 1911, and to nothing in 1912; in no year has the industry of Quebec assumed any great importance. The Nova Scotia industry was in existence prior to 1897, but rapid advances were made in 1901 and in 1904 to 1905. In the calendar year 1912 Nova Scotia produced as much as 424,994 tons of pig iron. Ontario has realized the most phenomenal growth of her iron

ing Mills Company was formed to build a foundry and a wire and nail factory at Fort William. In the same year all the radiator companies of Canada were amalgamated as the Steel and Radiation Company of Canada, and in 1912 this company built a new boiler and radiator plant at St. Catherines. In 1910 there were mergers of several malleable castings companies and of several machinery companies. The International Tool Steel Company was formed to manufacture high-grade steel for the making of edge tools. In 1911 the Canadian Tube and Iron Company built a plant at Côte St. Paul, Quebec, for the manufacture of rods, tubes, bolts, and girders. The Canada Steel Company built a mill at Hamilton to roll steel bars and to manufacture parts of farm implements from old scrap rails. In 1910 the Eastern Canada Steel and Iron Works of Quebec erected a large plant to manufacture structural steel for buildings, railways, etc., at Quebec, and it doubled the plant in 1911. In 1912 and 1913 three English firms established branches in Canada to manufacture boilers, window sashes, and tools, respectively. In 1913 the Owen Sound Rolling Mills were incorporated to manufacture wrought iron and steel piping and tubing, pipe fittings, bar iron, steel rods, structural steel, fish plates, spikes, and steel rails. A German firm established a company to handle its products and possibly to build a mill if sales should justify such a scheme. The Imperial Iron and Steel Corporation built a rolling mill and a horseshoe factory at Prince Albert, Saskatchewan. The Swedish Crucible Steel Company and the Detroit Steel Products Company built factories at Windsor, Ontario, and the American Titanic Iron Company of Quebec was formed to produce iron and steel.

[1] See Appendix B, Table II.

and steel industry. In 1895 no pig iron was produced in the Province. It was the Hamilton Furnace that made Ontario an iron-producing Province in 1896. At the present time Ontario, whose output was 526,635 tons in 1912, produces more pig iron than all the other Canadian Provinces together.

Another striking feature is that the industry is rather definitely localized. In Nova Scotia, Sydney, North Sydney, and Sydney Mines are the chief centers of the industry, due largely to the existence of coal supplies. Montreal and its vicinity contain practically all the important establishments in Quebec. Although Ontario's industry is more widely distributed, the chief centers are Sault Ste. Marie, Midland, and Hamilton. Deseronto and Port Arthur are less favored points, and the establishments in these places are correspondingly small. Port Colborne has recently become a new iron center.

The growing importance of the steel branch of the industry is simply an expression of a general world-wide tendency. The manufacture of steel was begun in Canada as early as 1883 by the Nova Scotia Steel Company and the Montreal Steel Works, but there were practically no additions to the steel furnace capacity until, in 1900, the Hamilton Company added a steel branch to their plant. The Dominion Iron and Steel Company and the Algoma Steel Company, which have grown up since 1900, turn practically all their large output of pig iron into steel billets. Wrought iron and puddled bars have practically passed from the iron and steel vocabulary. Indeed, the iron produced by the larger companies is usually turned into steel without even being moulded into pigs.

Although the manufacture of finished products is always the most important phase of an industry, it is just this feature of development that is so frequently forgotten, while the primary industry receives the bulk of public attention. As we have seen, an increasing number of plants

producing highly finished articles have been put in operation, or the size of the old plants has been expanded in recent years. The most striking feature of this development is that a large part of it has occurred in the last decade. The value of the capital invested increased over 200 per cent between 1900 and 1910 as compared with but 54.7 per cent increase in the previous census period, and the value of the product advanced by over 225 per cent as compared with 22.2 per cent growth for the earlier decade.[1]

Part of this rapid advance in the finishing industry is due to the operations of the large iron and steel companies themselves. It seems to be a general principle that the company that can produce highly finished products is certain of a fairly stable market. Hence, when the iron and steel industry is under discussion, one must remember that a modern steel corporation is no small concern; in fact, it is apt to produce everything from iron ore and pig iron to tacks. In this respect, then, as well as in the increased output of primary products, the Canadian iron and steel industry has made phenomenal progress in recent years.

Finally, most of the Canadian companies have declared themselves efficient and prosperous. While it is a common and politic method to complain of depressions and difficulties, and to state publicly the dangers of the industry whenever protection is being discussed, it is still more common for the chief iron and steel financiers to laud the opportunities that lie in the future. The annual reports of the Steel Company of Canada, the Canada Iron Corporation, and especially the Dominion Steel Corporation, the Nova Scotia Steel and Coal Company, and the Lake Superior Corporation, glow with such terms as "moving smoothly," "every confidence," "cannot fail to secure prosperity," "decreased cost of manufacture." Obviously the recent ventures have been successful and the future is assured.

[1] See Appendix C, Table II.

CHAPTER X

THE COMBINATION MOVEMENT

§ 1. It would have been surprising, in these days of trusts, industrial combinations, and integration of industry, if the organization of a Canadian iron and steel trust to attack the United States Steel Corporation, or the amalgamation of the Canadian companies with the United States Steel Corporation to form an "all-American" trust, had never been mentioned. As early as 1899 a suggestion was made that Canadian interests in the iron trade should unite in an organization which could purchase supplies through a central agency and sell products in the same way without destroying competition or opposing public interest.[1]

Although no such comprehensive scheme has as yet been devised or realized, there has been evidence from time to time that the producers of certain kinds of articles have formed associations which have been quite effective in their control over the prices of their particular products. It would require the "big stick" of a Roosevelt or the imagination of a Pujo Committee to ferret out the truth in respect to intricacies of relationship between the Canadian iron and steel companies. Their actual amalgamation has attracted attention, and it is the purpose of the present chapter to estimate so far as may be possible the extent and character of this movement.

§ 2. Between the years 1890 and 1900 there was a phenomenal growth in the wire-nail business and other hardware lines in Canada[2] as well as in the United States. But,

[1] *Monetary Times*, vol. xxxii, p. 1384.
[2] *Canadian Engineer*, vol. ix, p. 54.

in a country like Canada, with a comparatively small home consumption, manufacturers soon reach the point of overproduction, and the consequent struggle, besides competition from without, demand a certain unity to prevent price-cutting and the granting of excessive credits and discounts.[1]

As we have seen, the tariff on most hardware articles was increased in 1887, and competition soon developed. To meet this, associations were formed from time to time and maintained so far as possible. It is not evident just when the associations were first organized, but they appear to have secured satisfactory control by 1893.[2] Possibly the associations were formed in 1892; possibly they existed before and were reorganized in that year. At all events, manufacturers of iron products were in Toronto in January, 1893, forming associations of makers of bar iron, cut nails, horseshoes, bolts and nuts, rivets and burrs, screws, plain wire, barbed wire, and wire nails.[3] A shovel association is supposed to have existed from about the same time.[4] The producers of these different articles were usually the same persons, and the features and methods of the various associations were practically uniform. The main features may be briefly set forth.

In the first place, all producers of certain goods were invited to join an association. Frequently individual members found it advantageous to resign from the association and forfeit their deposits in order to gain the advantage of increased profits on a more extensive output and sale. Later they would be invited to reënter the fold. In short, the associations were made as comprehensive as possible, and included the Montreal Rolling Mills, the Ontario Rolling Mills of Hamilton, the Ontario Tack Company,

[1] *Iron Age*, vol. LXVI, November 29, p. 55.
[2] *Hardware and Metal*, December 30, 1905, p. 21.
[3] *Monetary Times*, vol. XXVI, p. 788.
[4] *Iron Age*, vol. LIX, February 11, p. 16.

Pillow-Hersey Company of Montreal (which was absorbed by the Montreal Rolling Mills in 1903, but still retained its identity so far as the association agreements were concerned), the Graham Nail Works, the Maritime Nail Company of St. John, W. H. Woodall, Portland Rolling Mills of St. John, the Peck Benny Rolling Mills of Montreal, J. Pender and Company of St. John, and the Abbott-Mitchell Company of Belleville, Ontario. Not all of these belonged to the associations all the time or to all the associations at any time, but whenever they began to act independently, they were invited to conform to the rules by the secretary, "Jenkins and Hardy," [1] of Toronto; and if they refused, other steps were taken against them.

The point of departure in the method of the associations was the adoption of a base price for the different articles, from which price variations could be made, subject to the rules of the associations. For instance, during several years, the quoted price of cut nails was $2.10, but in 1895 this was raised to $2.50 under the protection of higher prices in the United States.[2] In general, the prices varied from time to time according to the conditions of competition with independent Canadian firms, or with American producers, or by reason of price-cutting by the members of the associations themselves. The accompanying table indicates the maximum variations and the maximum and minimum price indices from 1890 to 1902.

The prices of nearly all articles were low from 1893 to 1897, but several cases of severe cuts occurred in 1897 and 1898. Other breaks in the price level occurred from 1902 to 1903 and 1906 to 1909. Since 1909 the prices of horseshoes, screws, and cut nails have risen considerably under the control of the Steel Company of Canada.

Yet these price lists, as quoted in trade journals, can scarcely be regarded as significant. Actual prices can only be estimated by deducting from the base prices the dis-

[1] A firm of accountants. [2] *Iron Age*, vol. LVI, p. 645.

The index numbers for the wholesale prices[1] *of certain articles supposedly controlled by various associations; the years for the maximum and minimum prices, 1890 to 1912; special years of decrease in price*

Article	Minimum		Maximum	
	Index number	Year	Index number	Year
Bar iron	79.6	1898	129.5	1890
Horseshoes	91.2	1898	116.6	1912
Screws (wood)	90.0	1908	137.9	1912
Cut nails	81.2	1897	119.6	1906
Wire nails	75.4	1898	127.2	1900
Galvanized barbed wire fencing	66.1	1912	149.9	1890

Special years of decrease

Bar iron	1894–98, 1901, 1904
Horseshoes	1897–99, 1901–02, 1909
Screws (wood)	1907
Cut nails	1891–92, 1897–98
Wire nails	1903, 1906, 1908
Galvanized barbed wire fencing	1895, 1897–98, 1909

counts given to the jobbers or wholesalers. Members of the associations received a list of jobbers who were entitled to special or "loyalty" discounts, provided they purchased from the association firms alone. Each jobber paid the base price; but after making a statement of the amount purchased, and a declaration that no goods had been purchased elsewhere, the discounts were returned by the secretary of the associations and thus the actual price to jobbers was less than the so-called base price. It was also found necessary from time to time to give special discounts to such large buyers as Massey-Harris and Company, whose importance, of course, enabled them to enforce their claim to special consideration.

These prices were further encroached upon from time

[1] Canada, *Wholesale Prices in Canada, 1890–12;* base period 1890 to 1899, inclusive.

to time by price-cutting of firms which had previously belonged to the associations. As tack and nail machines can be quickly installed, an opportunity to reap an extraordinary, if temporary, profit, was frequently too great a temptation to be withstood. Such an occurrence was at first guarded against by attempts to limit production by restricting the number of machines in operation and prohibiting an increase in their number. Deposits of from $50 to $200 were required, varying with the producer and the year. These deposits were forfeited whenever, upon complaint of one member of an association, it could be proved that another member had broken the agreement.

Much of the difficulty of maintaining prices was due to competition from without. When the nail associations of the United States broke up in 1896, the Canadian price of cut and wire nails promptly fell, and the associations were practically dissolved. As the Maritime Provinces nail firms seemed to have special difficulty in meeting the competition of both British and American firms, they were frequently tempted to cut prices. Whenever such practices were deemed necessary to keep the trade from outsiders, the secretary of the associations, who was supposed to pass judgment on the question of necessity, gave his sanction. For instance, from time to time the Ontario Rolling Mills were given permission to meet the competition of the McDonnell Rolling Mills and the Atlas Tack Company, as well as American mills. Such a practice was avoided whenever possible.

As the system of forfeiting deposits was not always satisfactory, a pool system was introduced in 1898. Each member was required to pay 15 to 25 per cent of the value of excess sales to the associations. If a man had not secured his share of the trade, he would receive 15 to 25 per cent on what he had been unable to sell. The aim of this system was the limitation of output and sales to a "desirable" quantity. The pool was divided according to an adjusted

proportion determined by the amount manufactured by each firm.

Although it is difficult to determine exactly what control was exercised by the associations, it appears that practically all the important firms were members of the associations from time to time, and that various measures, fines, special forms of competition, and pooling agreements were used to keep such members in line. The jobbers were controlled by a system of special and loyalty discounts which they could scarcely afford to sacrifice. Subject to English, American, and domestic competition, and the possibility of infraction of the agreements, prices were maintained as high as possible. The reduction of the tariff on such articles as nails, bar iron, galvanized barbed wire, and horseshoes, in 1896 and 1897, evidently reduced prices and temporarily disorganized the associations. In 1905 these hardware associations were prosecuted in the Toronto Police Court. The magistrate held that prices had been kept up, and committed the members of the associations for trial, but no report of the trial in a higher court can be found, and there is little evidence of the existence of associations since that time.

§ 3. As a matter of fact, there has been little need for this old form of combination in the hardware lines since 1909, in view of the formation of the Steel Company of Canada, which now controls the larger part of the output of hardware articles in Canada. This Steel Company of Canada was a combination of the Hamilton Iron and Steel Company and practically all the important hardware producing firms in Canada.[1]

The Hamilton Iron and Steel Company was itself a consolidation of a number of firms. In 1899 the Hamilton Blast Furnace Company and the Ontario Rolling Mills Company, a previous consolidation of two rolling mills in

[1] *Industrial Canada*, vol. xi, p. 331.

Hamilton, were amalgamated as the Hamilton Steel and Iron Company with a capitalization of $2,000,000. This arrangement united a smelting works, rolling mills, and forge works; all successful institutions. Some of the rolling mills had previously used wrought scrap and puddled bars as raw materials, and it was thought that the amalgamation would probably result in the complete disuse of scrap iron.[1] In the same year the 8 per cent dividend on $150,000 of preferred stock of the Equitable Mining and Developing Company, which was formed to mine ores in eastern Ontario under contract with the Hamilton Company, was guaranteed by the company.[2] In 1907 the Hamilton Steel and Iron Company was reorganized as the Hamilton Iron and Steel Company, with a capital of $3,000,000.

In the mean time a number of other consolidations of iron and steel interests had developed. In 1903 the Montreal Rolling Mills acquired the entire properties of the Pillow-Hersey Company of Montreal for $600,000,[3] and in 1906 it acquired the property of the Hodgson Iron and Tube Company,[4] and other expansions followed. In 1910 this company was operating three manufacturing plants in Montreal.[5]

In 1903 the Toronto Bolt and Forging Company bought the McDonnell Rolling Mills of Toronto for $90,000.[6] In 1910 a more extensive merger took place, when Mr. Watson, of the Toronto Bolt and Forging Company,[7] arranged an amalgamation of the Toronto Bolt and Forging Company, the Gananoque Bolt Company, the Belleville Iron and Horseshoe Company, and the Brantford Screw Company, as the Canada Bolt and Nut Company, with a capitalization of $1,000,000 bonds, $1,250,000 of 7 per cent

[1] *Iron Age*, vol. LXIII, April 20, p. 29.
[2] *Monetary Times*, vol. XXXIII, p. 433.
[3] *Iron Age*, vol. LXXI, May 28, p. 20.
[4] *Ibid.*, vol. LXXVI, p. 268.
[5] Baillie, Wood, and Croft, *Circular*, June 13, 1910, p. 3.
[6] *Canadian Engineer*, vol. X, p. 141.
[7] *Monetary Times*, vol. XLIV, p. 715.

preferred stock, and $1,250,000 of common stock. The shareholders of the constituent companies received 7 per cent cumulative preferred shares of the new company, plus a 25 per cent common-stock bonus.[1] In the case of the Brantford Screw Company, the holders of Brantford Screw Company preferred stock received $145 of the new preferred stock for every share of the old stock and, in addition, a bonus of 30 per cent in common stock of the new company; and the holders of common stock received $120 of the new preferred and a 30 per cent bonus in common stock, for every share of common stock in the old company.[2] Meanwhile, the Canada Screw Company of Hamilton had absorbed the Ontario Tack Company,[3] and it is interesting to note that in 1907 the stock of the Dominion Wire Manufacturing Company was purchased by W. H. Farrell and associates, of the United States Steel Corporation.[4]

Such preliminaries prepared the way for further developments in 1910, when the Steel Company of Canada was incorporated to acquire the business and undertakings or the outstanding bonds and stocks of the Hamilton Iron and Steel Company, the Montreal Rolling Mills Company, the Canada Screw Company, and the Canada Bolt and Nut Company.[5]

It was difficult for a time to secure a basis of amalgamation. As early as April, 1910, Mr. W. M. Aitken had purchased the Montreal Rolling Mills Company for $4,200,000 subject to the $500,000 bond issue. But further negotiations ceased for a time, since a basis of amalgamation could not be agreed upon.[6] Ultimately the new company authorized the issue of $15,000,000 of common stock, $10,000,000 of 7 per cent cumulative preferred stock, and $10,000,000 of 6 per cent bonds. Of these, $11,500,000 of

[1] *Hardware and Metal*, January 8, 1910.
[2] *Monetary Times*, vol. XLVIII, p. 38. [3] *Ibid.*, vol. XLIV, p. 1812.
[4] *Hardware and Metal*, July 16, 1910, p. 35.
[5] *Monetary Times*, vol. XLIV, p. 2412. [6] *Ibid.*, p. 1812.

common stock, $6,500,000 of preferred stock, and $6,850,000 of bonds were issued. The capitalization was supposed to be based on the ascertained earnings of the Hamilton Iron and Steel Company, the Canada Screw Company, and the Montreal Rolling Mills for the preceding years, and the estimated earnings of the newly formed Canada Bolt and Nut Company and of the Dominion Wire Manufacturing Company.[1] The different concerns agreed that bonds should be issued to the extent of two thirds of the appraised value of the properties, preferred stock to the extent of one third of the appraised value of the properties, together with the liquid assets, and that common stock should be issued against the earning capacity as indicated by the history of the companies, provided that no dividends should be paid on common stock until there was a sufficient surplus in the treasury to pay dividends on preferred stock for one year in advance.[2] Incidentally, the shareholders of the Hamilton Iron and Steel Company held out for $9,300,000 of the stock for their $3,000,000, and the Montreal Rolling Mills shareholders got $300 per share for stock quoted at $250.[3] The holders of Dominion Wire Manufacturing Company stock, persons connected with the United States Steel Corporation, received $250 per share.[4] Since the formation of the company, a further issue of $650,000 of bonds has been made for improvements and additions in the form of rod and steel mills, making the total outstanding issue $7,000,000.[5]

The advantages of the consolidation have frequently been stated. In the first place, it was claimed that reductions would be made in the cost of administration. The Toronto office of the Canada Screw Company was remodeled, and the offices and office staffs of the Montreal

[1] *Hardware and Metal*, July 16, 1910, p. 35.
[2] *Monetary Times*, vol. XLVIII, p. 38.
[3] *Hardware and Metal*, April 16, 1910, p. 34.
[4] *Globe*, July 19, 1910, p. 12. [5] *Annual Report*, 1911.

Rolling Mills and Dominion Wire Manufacturing Company were removed to the Toronto office,[1] and the staff of the Steel Company reorganized.[2] The promoters hoped that transportation costs would be lowered by letting each mill look after its own territory, and one traveler do the work formerly done by several.[3] Economies in the purchase of supplies and materials, increased efficiency due to specialization of the individual plants, and the avoidance of unnecessary duplication of work were other obvious possibilities.[4] Incidentally, it appeared that the Hamilton Steel plant might supply the raw materials, pig iron, and wire rods for the finishing mills, which had been partly supplied by the Dominion Iron and Steel Company.[5]

There are other features of the consolidation which are more interesting and significant. Many of the finished articles produced by the plants in question are among the most highly protected iron and steel products; the rates varying from 75 cents plus 10 per cent under the British preferential tariff to 75 cents plus 25 per cent under the general tariff on iron and steel nuts, rivets, washers, bolts, etc., or 20 per cent and 35 per cent on nails, tacks, etc., and $22\frac{1}{2}$ per cent and 35 per cent on screws.[6] The inclusion of the Dominion Wire Manufacturing Company was regarded as placing the company in a commanding position in the bolt, nut, nail, and screw markets. While competition was not entirely eliminated, it was expected that prices would be held more stable in the future.[7] The company still has the London Rolling Mills and the Graham Nail Company, and more recently the Dominion Steel Corporation as chief competitors, but the location of its own plants

[1] *Hardware and Metal*, August 6, 1910, p. 42.
[2] *Ibid.*, August 20, 1910, p. 37.
[3] *Monetary Times*, vol. XLV, p. 40.
[4] Baillie, Wood, and Croft, *Circular*, 1910.
[5] *Monetary Times*, vol. XLV, p. 48.
[6] Customs Tariff, 1907, Items, 412–17.
[7] *Hardware and Metal*, June 4, 1910, p. 39.

at Lake Ontario and St. Lawrence River ports, together with proximity to the market, gives the company a particularly strong position in supplying the hardware trade.[1]

§ 4. Many Canadian companies are the outgrowth of a long period of development, but few exemplify this fact more than the Nova Scotia Steel and Coal Company. As we have seen, the Nova Scotia Forge Company was formed in 1872 with a capital of $4,000, to manufacture various kinds of forgings from wrought and scrap iron, and a profitable industry was carried on at New Glasgow and Trenton until 1882. At that time mild steel began to attract attention in the manufacture of axles and other forgings; so, to keep abreast of the times, the Nova Scotia Steel Company, with a capital of $160,000, was formed to manufacture steel by the Siemens-Martin open-hearth process [2] from scrap iron and imported pig iron. The original forge company became a large buyer of steel ingots and billets from the new concern, which, in turn, was dependent for its repair work on the forge company. Hence, in 1889, to insure economy of operation, the two companies, which were really controlled by identical interests, were amalgamated as the Nova Scotia Steel and Forge Company, and extensions and additions were made to the plant.[3] For a time the new company was the only producer of steel in Canada, and enjoyed the benefit of the protective tariff.[4]

In 1888 the proprietors decided to build a plant to manufacture pig iron for use in the steel plant, but as the risk of the new proposal was great, a new company, the New Glasgow Coal, Iron, and Railway Company, was formed with a capital of $1,000,000.[5]

The interdependence of the steel works and the blast

[1] *Hardware and Metal*, June 4, 1910, p. 39.
[2] *Industrial Canada*, vol. XI, p. 328.
[3] Canada, *Report on Mining and Metallurgical Industries*, p. 544.
[4] *Journal of the Iron and Steel Institute*, 1895, no. 1, p. 528.
[5] *Industrial Canada*, vol. XI, p. 328.

furnace was a large factor in the success of each. The steel mills demanded an increasing amount of iron, much to the advantage of the blast furnace company, which weathered the depression of 1895 to 1896 with success.[1] The obvious community of interest suggested the advisability of another consolidation as soon as the practicability and success of the new project was proved. Consequently, in 1895, the Nova Scotia Steel Company was formed to purchase[2] both plants. The steel works were extended, and thus the furnace could be operated more regularly.[3] As the pig iron was entirely under its own control, the company reduced the cost of steel, and thereby secured orders that otherwise might have gone elsewhere.[4]

In 1900 the Nova Scotia Steel Company purchased as a going concern the property and business of the General Mining Association, including leases of coal areas and mines with good shipping facilities,[5] for $1,500,000.[6] In 1901 the Nova Scotia Steel and Coal Company was formed to take over the properties of the Nova Scotia Steel Company with its acquired properties of the General Mining Association. Common stock amounting to $5,000,000 and $2,000,000 of 8 per cent cumulative preferred stocks were provided for. Of these, $3,090,000 of common stock, with a bonus of $1,030,000 of preferred shares, were issued to acquire the properties of the Nova Scotia Steel Company and a bond issue of $1,500,000, that had been put out for the purchase of the General Mining Association properties.[7] The directors of the Nova Scotia Steel Company became the directors of the new company,[8] which immediately entered upon an era of development at Sydney Mines and New Glasgow.

[1] *Canadian Mining Review*, vol. XI, p. 35.
[2] *Ibid.*, vol. XIII, p. 97. [3] *Iron Age*, vol. LVI, p. 1212.
[4] *Canadian Mining Review*, vol. XV, p. 256.
[5] *Ibid.*, vol. XX, p. 166. [6] *Monetary Times*, vol. XXXIV, p. 108.
[7] *Canadian Mining Review*, vol. XX, p. 166.
[8] *Commercial and Financial Chronicle*, vol. LXXIII, p. 76.

By 1901 the Nova Scotia Steel and Coal Company had gradually acquired a business, thoroughly satisfactory in character, although capable of being more fully extended. The company owned coal mines and iron ore beds of a very extensive and desirable character; it produced its own pig iron to feed its own steel furnaces, which, in turn, supplied a finishing plant that was at that time second to none in the country. The amalgamations that have been described were simply the result of a natural development. As new phases of the industry were developed, it seemed advisable to test them under the guise of a new company, but once that phase was a proved success, the natural course was to amalgamate it with the older concern into a well-rounded industrial and financial organization.

This policy of financing conservatively the newer projects has been followed down to the present time. In 1912 the Eastern Car Company was formed by the same interests to carry on the business of car-building. The directorate of the company is practically the same as that of the Nova Scotia Steel and Coal Company, and the entire issue of common stock has been taken up by "Scotia," while the principal and interest of a $1,000,000 bond issue is guaranteed by the same company.[1] In short, any consolidation of companies now represented by the Nova Scotia Steel and Coal Company is simply a natural phase of the expansion of business into new lines and an illustration of integration of industry, rather than a combination of competing firms.

§ 5. The Dominion Steel Corporation with a capitalization of about $70,000,000, including the funded debt and the preferred and common stocks of the constituent companies not yet purchased by the corporation, is said to be the largest industrial consolidation of recent years in Canada. Frequently, this corporation is discussed as a second

[1] *Monetary Times*, vol. XLVIII, p. 2223.

"Steel Trust," controlling prices indiscriminately. The truth is that the original Dominion Steel Corporation was simply an amalgamation of two interdependent companies doing entirely different kinds of business.

The Dominion Iron and Steel Company was formed in 1899 by the interest back of the Dominion Coal Company. As the new industry was to provide a profitable market for coal, the first link between the two companies was joined and ever since they have been closely connected.

On June 29, 1899, a contract, signed by the two companies, provided for a supply of coal at $1.20 per ton. The Dominion Iron and Steel Company was given the right, up to January 1, 1903, to lease the Dominion Coal Company properties, paying all the latter's fixed charges and 6 per cent on the common stock, provided that if at any time the output of coal should exceed 3,500,000 tons annually, the lessee should pay the lessor an additional 15 cents per ton, and that $600,000 should be deposited before the lease should go into effect, to be forfeited in case the lessee should fail to make the payments called for in the lease.[1] That bituminous coal, run-of-mine, was selling at this time in Montreal at $2.72 rather reflects on the merits of the contract from the coal company's point of view,[2] considering that freight charges to Montreal were about $1.[3]

In 1901 Mr. Whitney, "on account of poor health," sold a controlling interest in the companies to James Ross and Canadian associates of his in Montreal, and Mr. Ross was elected president of the companies.[4]

In April, 1902, the opportunity to lease the properties of the Dominion Coal Company was taken up. Contrary to the expectation that the earnings of the company would pay its own dividends, plus interest on the bonds and the

[1] *Commercial and Financial Chronicle*, vol. LXIX, p. 79.
[2] *Wholesale Prices in Canada, 1891–1911*, p. 192.
[3] Canada, *Report on Mining and Metallurgical Industries*, p. 597.
[4] *Commercial and Financial Chronicle*, vol. LXXIII, p. 1267.

dividends on the preferred stock of the Dominion Iron and Steel Company, and that substantial returns would fall to the common stock of the steel company,[1] the steel company was soon carrying a large floating debt,[2] and could not get enough capital to complete its finishing mills and at the same time carry on the coal business. On the other hand, the coal company, which was very strong financially, could develop the coal property without being hampered by want of capital.[3] Besides, it claimed that the Dominion Iron and Steel Company had an undue opportunity to deplete and plunder the coal mines. At this time Mr. Ross resigned the presidency of the Dominion Iron and Steel Company, and Mr. J. H. Plummer, who had already been elected to the board, was chosen to take his place. The lease was revoked, and a new coal contract providing for the delivery of a quantity of freshly mined run-of-mine coal, necessary for four blast furnaces and accessories, was agreed upon, on condition that the coal company was given the option of supplying slack coal after four years, if not to the disadvantage of the steel company.[4] In 1905 the Dominion Iron and Steel Company gave notice for a large amount of coal for new furnaces which would be put in operation during 1906. The coal company, which found it difficult to meet these demands without curtailing the supply to other customers, who were purchasing coal at more remunerative prices, proceeded to open another pit on what they believed to be the Phelan seam, which had been chosen by the steel company to supply the proper kind of coal. But the coal from the new mine was found, on analysis, to be useless, was rejected by the steel company, and many consignments were taken back by the coal company.

[1] *Commercial and Financial Chronicle*, vol. LXXIV, p. 832.
[2] *Canadian Annual Review*, 1903, p. 507.
[3] *Commercial and Financial Chronicle*, vol. LXXVII, p. 300.
[4] *Statist*, vol. LIII, p. 434.

After some discussion it was agreed that the steel company should accept for special purposes 75 tons per day from the new mine, if it was specially carded, so that it would not get mixed with coal for use in the coke ovens. This arrangement was continued for some months, and henceforth the chief difficulty was with the quantity delivered. As the coal company, in 1905 and 1906, never quite supplied the needs of the steel company, except in winter months, the steel company had to purchase coal elsewhere at higher figures in order to operate the plant efficiently. Under temporary agreement the steel company, to assist the coal company, agreed to accept a portion of the deliveries in slack and banked coal; but as deliveries became still more unsatisfactory, the manager of the steel company gave notice in October, 1906, that only freshly mixed run-of-mine coal from the Phelan seam would be accepted. After November 1, 1906, the coal was sent, marked simply "Run-of-Mine, Phelan Seam," though analysis showed that much of it was from the new pit and so high in sulphur as to be useless in the manufacture of iron and steel. When protests were made and notice was given that all coal containing sulphur in excess of 4 per cent would be rejected, the coal company gave notice that the steel company's action was interpreted as a clear repudiation of the contract, which it should consider as terminated. When the coal company ceased supplying coal, the steel works were temporarily closed until coal could be secured elsewhere at an increased cost,[1] which was charged to the Dominion Coal Company. A suit for damages was promptly launched by the steel company against the coal company. In 1907 Judge Longley, of Sydney, decided in favor of the steel company, but the case was subsequently carried to the higher court and finally to the Privy Council.[2] All offers of settlement made

[1] *Nova Scotia Law Reports*, 1909, pp. 80–91.

[2] *Commercial and Financial Chronicle*, vol. LXXXV, p. 866.

by the coal company were rejected,[1] and finally, in 1910, the Privy Council declared in favor of the steel company, but the coal company, owing to the increasing costs of producing coal and the increasing price, was given the power to declare the contract at an end.[2] In 1910 the claims of the steel company were paid up, and a price of $1.55 for coal was decided upon, a price which represented an advance to the coal company of $216,000 on an output of 800,000 tons per year.[3] Back dividends on the preferred stock of the Dominion Iron and Steel Company, which had not been paid since 1903, were fully paid up, and financial conditions became favorable for further development.

During the period of conflict, the amalgamation of the two companies was, on several occasions, suggested as a solution of the whole difficulty. In March of 1907 there was a pronounced effort to take the control of the coal company out of the hands of Mr. Ross and his associates. Many shareholders of the coal company were dissatisfied with the management and were giving their proxies to certain steel interests.[4] In 1907 a bill was introduced in the Nova Scotia Legislature to permit the Dominion Iron and Steel Company to guarantee the payment of principal and interest of bonds or other securities of companies, the majority of whose stock was held or controlled by that company. It was said that the company had acquired coal areas in Cape Breton and wanted to form a subsidiary company to operate the same.[5] Later in the year [6] 2000 shares of the New Brunswick Iron Company were purchased at $25 per share.

In June of 1907 Mr. Ross was in possession of a large quantity of Dominion Iron and Steel Company stock, which he had been buying quietly that year, to such an ex-

[1] *Commercial and Financial Chronicle*, vol. LXXXVI, p. 1591.
[2] *Ibid.*, vol. LXXXVIII, p. 508.
[3] *Monetary Times*, vol. XLIV, p. 1612.
[4] *Ibid.*, vol. XL, p. 1411.
[5] *Commercial and Financial Chronicle*, vol. LXXXIV, p. 696.
[6] *Canadian Mining Journal*, vol. XXVIII, p. 631.

tent that he had become the largest stockholder.[1] He controlled enough, it was thought, to give the coal people [2] control, and efforts were made to obtain control of the meeting of the steel company to be held in June, 1907.[3] But the meeting was postponed indefinitely to avert danger, and the coal company's scheme failed.[4]

From the point of view of the coal company an amalgamation scheme seemed desirable, since unity might make it possible for the steel company to accept slack coal, which it had refused to accept largely because it wished to maintain a favorable contract with the coal company. Instead of simplifying matters, the provision for an arbitration of the price at the end of every five years complicated the situation by adding a continued element of uncertainty.[5] The Dominion Iron and Steel Company was interested in an adequate supply of coal of proper quality.[6] As early as 1908 it was suggested that amalgamation would be of value in the employers' opposition to the intrusion of international unionism in Nova Scotia.[7]

In November, 1909, Mr. Ross confirmed a report that he had sold to a syndicate, representing the Dominion Iron and Steel Company, $5,000,000 of common stock at $95 per share, on condition that all shareholders be offered the same terms and be given an opportunity to deposit their shares within thirty days, duly assigned and endorsed. It was provided that if, at the end of the thirty days, the syndicate should fail to make satisfactory arrangements, Mr. Ross should have the right to terminate negotiations. The shares were to be paid for by $25 in cash in thirty days, and ten installments of $7 per share, payable at intervals of

[1] *Commercial and Financial Chronicle*, vol. LXXXV, p. 102.
[2] *Statist*, vol. LXIII, p. 688.
[3] *Commercial and Financial Chronicle*, vol. LXXXV, p. 866.
[4] *Monetary Times*, vol. XLI, p. 13.
[5] *Nova Scotia Law Reports*, 1909, p. 143.
[6] *Monetary Times*, vol. XLIII, p. 2113.
[7] *Canadian Annual Review*, 1908, p. 296.

three months for two and one half years with interest at 4½ per cent, payable quarterly. Holders of over 45,000 shares had agreed to retain their shares and to participate in the proposed combination to the extent of their holdings.[1] In fact, not more than 4000 shares were so deposited, and the holders were paid off at once.[2]

At the annual meeting of the Dominion Coal Company, on April 12, 1910, the possibility of consolidation and the relations to the Dominion Iron and Steel Company were informally discussed.[3] It was urged that the board should be representative, not only of the steel company and its friends as shareholders, but of other shareholders as well, and a promise was made that Mr. Butler, the new general manager of both companies, would carry on the management and relations between the two companies in a strictly impartial manner. The basis of a proposed merger was considered at some length. Mr. Plummer said that the fact that holders of 40,000 to 50,000 shares would have to be willing to accept the steel company's terms ought to be an ample safeguard against any unfair treatment. Unfortunately, the earnings of both companies were threatened, those of the coal company by a miners' strike, and those of the steel company by the loss of the bounties. Furthermore, it seemed difficult to estimate the value of either the coal beds or the iron ore deposits. Mr. Plummer felt assured that the merger would be a splendid consolidation of one of the finest coal fields in America, the finest ore deposit on tidewater on the continent, and an excellent steel plant admirably situated; and he declared that neither of the companies, with all their properties, would be nearly so strong separately as they would be combined. Therefore, he recommended amalgamation.

On April 20, 1910, a statement, submitted to the shareholders of the Dominion Coal Company and the Dominion

[1] *Commercial and Financial Chronicle*, vol. LXXXIX, p. 1350.
[2] *Ibid.*, vol. XC, p. 702. [3] *Annual Report*, 1909, pp. 14–19.

Iron and Steel Company on behalf of their respective boards of directors, proposed a union of the interests of the shareholders of the coal and steel companies by an exchange of one share in the common stock of the Dominion Steel Corporation and $4 in cash for each share of common stock of the Dominion Coal Company and Dominion Iron and Steel Company, with the cash consideration payable in quarterly installments of $1 per share. This payment of cash was equivalent to a dividend of 4 per cent per annum for one year, and, while forming part of the purchase price, was intended to obviate any call on either company for dividends until the coal strike and its effect had passed away and the new plant of the steel company was completed. The surplus earnings were to be used for strengthening the financial position of the two companies and for making permanent improvements.

Such were the conditions under which the consolidation was initiated. The probability that no dividends would be paid on the stocks of the constituent companies decided the question, and by November 1, 1910, 98.8 per cent of the entire common stock of the iron and steel company and 97.6 per cent of the entire common stock of the coal company had been exchanged. On that date $1,500,000 of 5 per cent Dominion Steel Corporation three-year debentures were issued to provide for the payment of $4 per share on the shares acquired. The steel corporation promised not to issue any bonds secured by mortgage while these debentures were outstanding.[1] Provision was made also for a possible issue of preferred stock of the steel corporation to redeem the preferred stocks of the constituent companies by exchange share for share.[2]

In this way the two interdependent companies, whose history had been marred by a series of difficult relations, entered on a period of peaceful union under one manage-

[1] Dominion Securities Corporation, *Circular*, November 1, 1910.
[2] Prospectus.

ment. The real purpose of consolidation was the assurance of a satisfactory supply of coal to the steel plant at a price satisfactory to the coal company. To the extent that stockholders of the constituent companies accepted shares of the holding company, the two interests became identical, and although the two constituent companies still exist, that separate existence is nominal, except for the interest of a very few independent holders of common shares of the Dominion Iron and Steel Company and the Dominion Coal Company, as well as the holders of bonded indebtedness and preferred stock of the same companies.

The principle of securing control of coal areas was carried further by the leasing of the properties of the Cumberland Railway and Coal Company in 1910. It is said that the option was taken by the Dominion Iron and Steel Company while the coal contract dispute was on, with the object of securing their own coal supply should the contract be broken.[1] The Cumberland Railway and Coal Company had been incorporated in 1883 as a consolidation of the Springhill and Parrsboro Coal and Railway Company and the Springhill Mining Company. It owned about thirteen square miles or 150,000,000 tons of good, clean coal, besides a railway of forty-two miles and sidings of sixteen miles, exclusive shipping piers at Parrsboro, and a fleet of tugs and ocean barges for coal-carrying.[2] It was capitalized at $1,000,000 of common stock and $1,500,000 of first-mortgage 6 per cent bonds.[3] In December, 1910, Mr. Plummer announced that a controlling interest in the company had been transferred to the leading directors of the Dominion Steel Corporation.[4] This seemed necessary because of a clause in the circular of April 20, 1910, providing that further issues of stock would not be made without the sanction of the stockholders. But at the annual meeting

[1] *Canadian Mining Journal*, vol. xxxi, p. 218.
[2] *Commercial and Financial Chronicle*, vol. xci, p. 1629.
[3] *Monetary Times*, vol. xlv, p. 2418. [4] *Ibid.*, p. 2340.

of the Dominion Steel Corporation on May 19, 1911, 6000 shares of the Dominion Steel Corporation were issued in exchange for 20,000 shares of the Cumberland Railway and Coal Company.[1] In addition, $979,000 of the company's 6 per cent bonds were redeemed by an issue of $1,174,000 of 5 per cent bonds [2] guaranteed by the steel corporation.[3]

The holding company form of consolidation was again called into operation in 1910, when the Dominion Coal Company decided to incorporate the Sydney and Louisburg Railway Company, to which the valuable railway property directly operated by the coal company might be transferred. This was done in the belief that the railway could be more satisfactorily carried on by an independent company controlled by the coal company through the ownership of all the capital stock of the railway company.[4]

In 1911, 2500 shares of Dominion Steel Corporation common stock were issued to acquire the stock of the Sydney Lumber Company, which owned a good property, consisting of sawmills, timber limits, and a large stock of lumber at Dalhousie, New Brunswick. The same method was followed in securing control of the Black Diamond line of steamships, owned by the company.[5]

Another feature of the Dominion Steel Corporation illustrates modern integration of industry. The constituent company known as the Dominion Iron and Steel Company owns not only iron ores, blast furnaces and steel furnaces, but also coke ovens, and finishing mills built by the company itself from time to time as the market seemed to warrant extensions of the business. Had these branches of the business been acquired through amalgamation with other companies or the purchase of stocks of other companies, the public would undoubtedly have considered such

[1] *Annual Report*, 1911, p. 15. [2] *Ibid.*, p. 7.
[3] *Commercial and Financial Chronicle*, vol. xcı, p. 1772.
[4] *Annual Report*, 1909, pp. 6 and 20.
[5] *Ibid.*, 1912, pp. 10–11.

operations as an example of the tightening of the grip of a great industrial octopus, a Canadian "Steel Trust." As a natural development of the business, the operation is practically uncriticized, and justly so, for it has simply aided in the reduction of costs of the various marketable products.

It is rather early to judge the merits of the consolidation, but a few statements may be made. In the first place, friction between the two most important companies has been entirely and permanently eliminated, much to the advantage of both. A constant supply of coal for the iron and steel plant and for other purposes is now assured, and by the acquisition of the Cumberland properties, which have since been discovered to be more valuable than was anticipated,[1] the open market may be easily cared for. Whether or not the consolidation of the coal companies so concentrated the power of the mine-owners as to bring to an end the succession of strikes, which had almost become a part of the coal-mining situation, is difficult to say, but in 1911 the strike was ended, much to the satisfaction of the companies. In short, one may regard the Dominion Steel Corporation as the result of a wise and conservative organization of various allied interests into a well-integrated system.

§ 6. At times some financial and industrial menagerie finds its way into the hands of one person. We have already seen how Mr. Clergue gradually developed industry after industry at Sault Ste. Marie, Ontario. When, in 1902, the Consolidated Lake Superior Company collapsed, it had a capitalization of $35,000,000 preferred stock and $82,000,000 common stock,[2] and owned practically all the stocks of the Ontario Lake Superior Company, the Algoma Steel Company, the Michigan Lake Superior Company,

[1] *Annual Report*, 1912, p. 18.

[2] *Commercial and Financial Chronicle*, vol. LXXI, p. 938.

the Tagona Water and Light Company, the "Soo" Pulp and Paper Company, the International Transit Company, the St. Mary's Traction Company, the British-American Express Company, and the Manitoulin and North Shore Railway.[1] After the reorganization of these companies into the Lake Superior Corporation, the Algoma Iron Works and the Lake Superior Iron and Steel Company were added to the list of subsidiaries.[2] In 1910 the Cannelton Collieries of West Virginia were purchased and operated by the Cannelton Coal and Coke Company, whose shares were all bought up by the Lake Superior Company, and the stock of the Fiborn Limestone Company of Michigan was purchased outright. In 1912 an important financial readjustment took place. The Algoma Steel Corporation, formerly the Lake Superior Iron and Steel Company, whose stock was owned by the Lake Superior corporation, took over the plant, properties, and business of the Algoma Steel Company, the Lake Superior Power Company, the Algoma Commercial Company, and the Cannelton Coal and Coke Company.[3] New bonds of the Algoma Steel Corporation, whose business and properties constitute the best and largest assets of the Lake Superior Company, are guaranteed by the parent company.[4]

As a "trust" the Lake Superior Corporation is obviously of little importance. It is merely a holding company that unites the companies which have from time to time been formed to develop separate branches of the corporation's business and interests. Its subsidiaries are not former competitors in any respect, not even in their demand for the superabundant power. In short, the Lake Superior Corporation is simply an example of extraordinary and exaggerated integration of industry, which has grown up more by accident than because of any industrial merits.

[1] *Canadian Annual Review*, 1903, p. 515.
[2] *The Annual Financial Review*, Canadian, April, 1911, p. 196.
[3] *Ibid.*, November, 1912, p. 99. [4] *Iron Age*, vol. LXXXIX, p. 1171.

§ 7. The combination movement is not altogether a recent feature of Canadian industry. Indeed, combinations of varying character have existed for a considerable time. Mr. George McDougall, who had leased the car-wheel foundry at Three Rivers in 1875, found it necessary in 1883 to supply his charcoal iron by the purchase and operation of the Radnor Forges. As this supply of iron was insufficient, two more furnaces were built at Drummondville, Quebec. Car wheels were manufactured at Three Rivers and Montreal,[1] Quebec, and at St. Thomas, Ontario. In 1899 the Canada Iron Furnace Company was formed to acquire the Radnor Forges and a car-wheel foundry at Three Rivers, and the industry was carried on with success.[2] In 1900 this Canada Iron Furnace Company built another plant at Midland, Ontario. In the mean time, the Canada Iron and Foundry Company controlled car-wheel and pipe foundries at Three Rivers, Montreal, St. Thomas, Hamilton, and Fort William, and, through acquisition, the foundry at Londonderry; and John McDougall and Company owned the furnaces at Drummondville, Quebec.[3] In 1902 the same interests, comprising the Drummonds, McDougalls, and the McCalls of Montreal, purchased the plant of the Londonderry Iron Company after Drummond, McCall, and Company had for some years used part of the plant in the manufacture of water pipe.[4] The Londonderry Iron and Mining Company was formed with a capital of $1,000,000 to acquire the said properties.[5] In 1904 the Torbrook ore deposits were purchased,[6] and in 1905 the Annapolis Iron Mining Company, with a capital of $1,000,000, was formed to carry on this phase of the work.[7]

[1] Bartlett, *op. cit.*, p. 519.
[2] *Canadian Mining Review*, vol. XII, p. 45.
[3] *Monetary Times*, vol. XLI, p. 2125.
[4] *Iron Age*, vol. LXX, October 2, 1906, p. 16.
[5] Canada, *Report on Mining and Metallurgical Industries*, p. 540.
[6] *Canadian Mining Review*, vol. XXII, p. 204.
[7] *Ibid.*, vol. XXVIII, p. 72.

In 1908 the Drummond Mining Company was formed to acquire the newly discovered ore deposit at Bathurst, New Brunswick.[1]

Thus, a group of industries had been evolved, dominated by the same interests. Drummond, McCall, and Company, a firm of iron and steel merchants in Montreal, practically controlled the marketing of all of the products.[2]

In 1908 occurred the first important merger in the industry that had received so much in bounties, when these allied firms were amalgamated as the Canada Iron Corporation, with a capitalization of $3,000,000 of 6 per cent preferred stock, $5,000,000 of common stock, and $2,920,000 of first-mortgage bonds and $2,500,000 of consolidated bonds.[3] Bessemer iron mines in Ontario were also acquired.[4] Bonds were issued to redeem bonds of the consolidated companies, and preferred and common stocks were issued as fully paid to the vendors in consideration for mines, blast furnaces, and foundries hitherto owned and operated by the merger companies.[5] Thus, in 1909 the Canada Iron Corporation owned four iron-ore mines, five blast furnaces and foundries in seven towns and cities, in three Provinces of Canada, and produced iron ore, pig iron, car wheels, cast-iron pipe, and special castings of all kinds.[6]

§ 8. In 1910 a syndicate, composed of Mr. K. W. Blackwell, president of the Investment Trust Company and of the Montreal Steel Works, with W. F. Angus, vice-president and general manager of the Montreal Steel Works, offered to purchase the Montreal Steel Works on a basis of 137½ plus a 7 per cent dividend on common stocks of that company, and the directors agreed to sell,

[1] *Canadian Mining Review*, vol. xxii, p. 540.
[2] *Industrial Canada*, vol. v, p. 713.
[3] *Annual Financial Review*, Canadian, November Supplement, 1912, p. 76.
[4] *Canadian Mining Journal*, vol. xxix, p. 636. [5] Prospectus.
[6] *Canadian Annual Review*, 1909, p. 671.

subject to the consent of 55 per cent of the stockholders.[1] The assent of more than this proportion had been secured previous to the public offer. It is said that Mr. A. J. Nesbit, of the Investment Trust Company, had been acquiring Montreal Steel stock quietly for more than a year.[2] Shortly after this, the company was merged with the Ontario Iron and Steel Company as the Canadian Steel Foundries with a capitalization of $8,050,000, $3,000,000 common, $1,400,000 preferred, and $3,650,000 of 6 per cent first-mortgage and collateral trust bonds. The capital of the constituent companies had been $1,300,000 for the Montreal Steel Works, and $500,000 for the Ontario Iron and Steel Company.[3] The increase in the capitalization was supposed to be based on future earnings after a new plant should be built at Longue Point with the proceeds of a bond issue.[4]

During the same period the Canadian Car and Foundry Company had been formed to unite the Canada Car Company, the Dominion Car and Foundry Company, and the Rhodes Curry Car and Foundry Company. While this is not primarily an iron and steel company, the promoters urged that the acquisition of the Montreal Steel Works would be valuable because the steel plant would supply the car company, which had been for some time one of the largest customers of the Montreal Steel Works;[5] and also because the latter had installed a special plant to produce the steel required by the car companies.[6] Incidentally, it may be noted that the Rhodes Curry Company had an iron foundry at Amherst, Nova Scotia, which could supply the Maritime market. To acquire control of the Canadian Steel Foundries, the Canada Car and Foundry Company issued $100,000 additional preferred stock and $375,000 of

[1] *Monetary Times*, vol. XLVI, p. 217.
[2] *Industrial Canada*, vol. V, p. 629.
[3] *Ibid.*, vol. XLV, p. 2726.
[4] *Ibid.*, vol. L, p. 80.
[5] McCuaig's *Circular*, April 5, 1911.
[6] *Monetary Times*, vol. XLV, p. 2726.

common stock, purchased most of the stock, and guaranteed the interest on the bonds of the newly formed foundries company. The whole arrangement seems to have been of mutual advantage, since a large part of the product of the foundries could be used by the car company, while the earning power of the subsidiary company was supposed to be increased by the manufacture of certain railway specialties, the patents for which were owned by the Canadian Car and Foundry Company.[1] Since the formation of this consolidation the company has built new plants at Amherst, Nova Scotia, Longue Point, Quebec, and at Fort William, Ontario, and in 1912 the plant of the Pratt and Letchworth Company of Brantford, which manufactures malleable iron castings, was acquired through the control of all the stock by the Canada Car and Foundry Company. Thus, the Canada Car and Foundry Company, producing about 85 per cent of the car-building capacity of Canada, seems in an especially strong position with its assured supply of semi-finished materials.

§ 9. On various occasions American capitalists have been charged with trying to corner all Canadian ores and the Canadian market in finished products. The Texada Island deposit in British Columbia has been supplying an American furnace. The Moose Mountain ore, partly owned by American capitalists, is being shipped to the United States. It is said that ores near Port Arthur were purchased in 1901 by the United States Steel Corporation.[2] The Oliver Iron Mining Company was at work in the Atikokan Range in 1906, collecting information on ores in all directions.[3] In 1912 the report was current that an iron ore deposit near Calgary, Alberta, was controlled by the United States Steel Corporation.[4] This corporation is sup-

[1] McCuaig's *Circular*, April 5, 1911.
[2] *Monetary Times*, vol. xxxiv, p. 1511.
[3] *Iron Age*, vol. lxxviii, p. 491. [4] *Globe*, January, 1912.

posed to be holding Canadian ores in reserve lest they fall into the hands of competitors.[1]

Through the American Steel and Wire Company, the United States Steel Corporation is supposed to have controlled the Canadian market in certain articles, not only through the ownership of a fencing wire and fence plant at Hamilton, Ontario,[2] but by certain agreements with the Canadian Hardware Association. The wire manufacturers were forced not to sell direct to the wholesale hardware dealers of Canada.[3] When the operation of the Dominion Iron and Steel Company's rod mill broke down this arrangement, agreements were made with the Canadian Hardware Association, requiring their members to buy barbed wire from the Steel Corporation, which, in turn, guaranteed a 10 per cent profit to the jobbers, and handled the trade in an entirely satisfactory manner. Although the price charged was one at which English firms could do business, yet no jobber would buy in England; for an attempt to do so would have resulted in a serious reprisal and the refusal of the Steel Trust to sell barbed wire to such firms. As English manufacturers could not supply all the demand, the United States Steel Corporation has had a strong weapon.[4] It is relevant to note that apparently no firms produce barbed wire in Canada at the present time, whereas several produced such products some ten years ago.

In 1906 control of the Dominion Wire Manufacturing Company of Montreal was secured by Mr. J. J. Farrell, a director of the United States Steel Corporation; but in 1910 control was transferred to the Steel Company of Canada.[5]

More recently the United States Steel Corporation has decided to build a plant at Sandwich, Ontario. It has

[1] Jeans, *op. cit.*, p. 120. [2] *Iron Age*, vol. LXXXIII, p. 1380.
[3] *Ibid.*, vol. LXXIII, April 14, p. 31.
[4] *Ibid.*, vol. LXXIV, August 11, p. 12.
[5] *Hardware and Metal*, vol. XVIII, February 17, p. 30.

been suggested that this move will result in the combination of Canadian firms with the United States Steel Trust. Whether the Steel Trust will be able to force down prices in Canada, or whether it will secure control of Canadian firms, only the future can determine.

§ 10. Considerable discussion has centered in the possibilities of further merging of the Canadian iron and steel interests and of the possible present interrelations of existing companies. In 1901 a rumor was abroad that Mr. Morgan had bought the Sydney Works for over $50,000,000, but Mr. Clergue and Mr. Whitney published statements that the Canadian industries would maintain independence, and that the United States Steel Corporation was too heavily capitalized to give troublesome competition.[1] In 1903 it was said that Mr. Clergue was a director of the Canada Iron Furnace Company,[2] and in 1905 the Lake Superior Company was reputed to be holding an interest in the blast furnace at Midland.[3]

Once the Canada Iron Corporation, the Dominion Steel Corporation, and the Steel Company of Canada were formed, further developments were expected. When interests connected with both the Dominion Steel Corporation and the Steel Company of Canada met in Montreal in June, 1900, to confer on the question of a possible conflict in the choice of names of the companies,[4] the report was circulated that negotiations were pending for a merger of the two companies.[5] The presence of three gentlemen connected with these companies in England in August of 1910 was seized upon as further evidence of a forthcoming merger.[6] Moreover, Mr. William McMaster was a director

[1] Morang's *Register*, 1901, pp. 93–95.
[2] *Iron Age*, vol. LXVI, December 27, p. 17.
[3] *Iron Trade Review*, vol. XXXVIII, February 2, p. 66.
[4] *Monetary Times*, vol. XLIV, p. 2412.
[5] *Commercial and Financial Chronicle*, vol. XC, p. 1556.
[6] *Ibid.*, vol. XLIV, p. 429.

of both the Dominion Steel Corporation and the Montreal Rolling Mills,[1] which purchased largely from the Dominion Iron and Steel Company.[2] The Ontario Tack Company [3] and the Dominion Wire Manufacturing Company [4] had also been customers of the Dominion Iron and Steel Company. When the Steel Company of Canada decided to build wire-rod mills of its own to supply its own plants, the Dominion Steel Corporation announced that it would erect its own wire and nail mills as a customer to take the place of those it was losing.[5] But shortly a report was issued that the Steel Company of Canada would not build wire-rod mills and that the Dominion Steel Corporation would not build wire nail or screw works.[6] In spite of this, both companies have followed the original plans and have built mills for the production of intermediate products and finished products respectively.

A fight for the control of the Nova Scotia Steel and Coal Company aroused a similar discussion in 1910 and 1911. At the end of 1909 a stock bonus of 20 per cent was given to the stockholders, and a dividend was declared. That an unusual influence was at work was soon evident. "Scotia" became one of the most prominent stocks in the daily list of sales. It was said that a syndicate, including Mr. Rodolphe Forget, actually had control of the company, but that at the last moment a slip was made and the previous control was returned to power. A peaceful solution was reached through the purchase of the Forget interests by Mr. Harris, the president.[7] Some believed that Mr. Forget wished to make "Scotia" the basis of a large Canadian steel and coal merger,[8] but little attention was paid to this

[1] *Commercial and Financial Chronicle*, vol. XLV, p. 48.
[2] *Monetary Times*, vol. XLV, p. 48. [3] *Iron Age*, vol. LXXV, p. 221.
[4] *Hardware and Metal*, vol. XXII, June 11, p. 38.
[5] *Monetary Times*, vol. XLIV, p. 2514.
[6] *Hardware and Metal*, vol. XXII, June 25, p. 42.
[7] *Monetary Times*, vol. XLV, p. 424.
[8] *Globe*, March 10, p. 10.

rumor which was generally regarded as premature.[1] Yet "the industrial tendency of the day is toward such combination. With *increasing competition and a growing market*, a consolidation is not unlikely."[2] "The present tendency will not be stayed. Before many years we may have a great steel company controlling the Canadian market and wielding considerable power and fostering an export trade. The difficulties in the way of amalgamation are being overcome by the merger of five companies in the Steel Company of Canada. The steel-coal merger was a side-step, but not backward."[3] Such was the comment of the *Monetary Times*.[4]

§ 11. The causes and character of this combination movement are not easily described. Most of the amal-

[1] *Monetary Times*, vol. XLV, p. 524. [2] *Ibid.*, p. 911.

[3] *Ibid.*, vol. XLIV, p. 2412.

[4] Other mergers have been organized from time to time. In 1910 the Canadian Machinery Corporation was formed to include the MacGregor, Gourlay and Company of Galt, G. Ballantyne and Company of Preston, the Hespeler Machinery Company, the Goldie and McCullock Company of Galt, and the Sussex Manufacturing Company of New Brunswick, practically all the firms in Canada manufacturing woodworking machinery and tools. The Smith's Falls Malleable Castings Company, the McKinnon Dash and Metal Company of St. Catharines, and other companies in Brantford and Walkerville, manufacturing malleable castings for railroads, agricultural implements, and automobiles, were merged in 1910. In the same year the Expanded Metal Company, the King Radiator Company, the Dominion Radiator Company, and Taylor-Forbes Company, all the firms in this line of business in Canada, were consolidated as the Steel and Radiation Company with a capital of $5,000,000. In 1912 the Metal Sheeting and Siding Company absorbed the A. B. Ormsby Company, raising the capitalization from $700,000 to $1,500,000. The Canada Foundries and Forgings Company was capitalized at $3,000,000 to take over the Canadian Billings and Spencer, Ltd., the James Smart Manufacturing Company, Ltd., and the Canada Forge, Ltd. In 1884 the Gananoque Spring and Axle Company was formed to consolidate the Gananoque Spring Company and the Byers Manufacturing Company, manufacturers of axles at Gananoque. In 1890 the properties of the Dowsley Spring and Axel Company of Chatham, Ontario, were purchased. In 1913 the Ontario Steel Products Company was formed to acquire the properties of the Gananoque Spring and Axle Company and the D. F. Jones Manufacturing Company of Gananoque.

gamations are so recent that the effect of combination on earnings cannot possibly be separated from the effects of other influences. It is very difficult to gain any idea of the earning power of the corporations for two or three years at the least. It may be said that there is little evidence of a decrease of working expenses, especially as larger salaries have been found necessary or desirable for men capable of taking charge of the combinations.[1] It is a noteworthy fact that most of the combinations have consolidated plants manufacturing different kinds of products. Companies producing finished articles have secured control of raw materials such as coal, ore, and limestone, or intermediate products such as wire rods, steel castings, and pig iron. In other cases a market for pig iron or steel has been assured by such mergers as the Steel Company of Canada. In the case of the Nova Scotia Steel and Coal Company and the Canada Iron Corporation, allied or identical interests have been simply consolidated under one organization and management.

The forms of consolidation have been varied. The lease of the plant with a guaranty of interest on bonds and dividends on stocks has been used by the Dominion Steel Corporation, and a guaranty of interest and dividends was the method used in connection with the control of the Canadian Steel Foundries by the Canada Car and Foundry Company. Informal "gentlemen's agreements" may or may not have existed. Factor agreements were used by the United States Steel Corporation to control some lines of the hardware trade. Contracts between certain firms might even be regarded as a form of consolidation. It is said that at times the marketing of such products as steel rails has been controlled by one firm, Drummond, McCall and Company of Montreal,[2] as the selling bureau. Of late, the holding company seems to be the more popular

[1] *Financial Post*, October 22, 1910, p. 2.
[2] *Industrial Canada*, vol. v, p. 380.

form, as in the case of the Dominion Steel Corporation, the Lake Superior Corporation, and the Canada Car and Foundry Company. Usually, however, the plants have been purchased outright and the previous stockholders receive bonds and stocks, part of which may be a bonus for their previous ownership or holdings. The existence of interlocking directorates cannot be denied.

Various causes or reasons for consolidation have been set forth. The assurance of a market for raw or intermediate materials, the saving of wastes of competition in the form of excessive costs of marketing, selling and delivery, the specialization of plants, and the repression of labor unions have seemed desirable ends; but there is little evidence that much has been accomplished. It is true that the Dominion Steel Corporation ended a strike that probably would have been ended in some other way. The acquisition of sources of raw materials or an outlet for such raw and intermediate materials seems to be the most valuable industrial feature of consolidation.

Charges have been made that one other cause of consolidation has been the promotion activities of a few Canadian financiers. No doubt the promoters have not gone unrewarded. A table of the securities issued by the constituent and the amalgamated companies reveals some interesting facts.

The increase of actual capitalization, including bonds, amounts to about $27,000,000, of which $24,000,000 was produced in connection with companies consolidated by Sir Max Aitken; namely, the Canada Car and Foundry Company and the Canadian Steel Foundries, and the Steel Company of Canada. As the capitalization of the constituent companies of the Dominion Steel Corporation[1] is some $23,000,000 greater than that of the holding com-

[1] The overcapitalization of the Dominion Iron and Steel Company before it was combined with the Dominion Coal Company was probably nearly $12,000,000.

Table of Securities issued

Company	Capital before amalgamation, including bonds	Capital after amalgamation — issued			Total	Total authorized
		Bonds	Preferred	Common		
Canada Bolt and Nut	$935,000	$650,000	$900,000	$900,000	$2,450,000	$3,500,000
Canada Machinery Corporation	1,710,000	400,000	908,800	653,400	1,962,200	4,000,000
Canadian Car and Foundry Co.	11,200,000	3,500,000	6,100,000	3,875,000	13,475,000	20,000,000
Canadian Steel Corporation	1,800,000	3,650,000	1,400,000	3,000,000	8,050,000	10,000,000
Dominion Steel Corporation	67,461,500	1,500,000	7,000,000	35,656,800	44,156,800	52,500,000
Steel Company of Canada	9,969,500	8,000,000	6,496,300	11,300,000	25,996,300	40,000,000
Steel and Radiation	435,500	300,000	279,600	1,068,900	1,648,500	6,500,000
Canada Foundries and Forgings	500,000	67,000	960,000	960,000	1,987,000	3,000,000
Metal Sheeting and Siding Co.	700,000		500,000	1,000,000	1,500,000	1,500,000
	$84,711,500	$18,067,000	$24,544,700	$58,614,100	$101,225,800	$141,000,000

pany, the increase of capitalization of the other iron and steel companies seems to have been even greater than appears on the surface.

§ 12. Besides the obvious mergers and combinations of firms, some community of interest between corporations seems to have existed from time to time. Several of the interrelationships[1] have already been noted in cases where the corporations have since been united, as in the case of the Dominion Steel Corporation, the Steel Company of Canada, and the Canada Iron Corporation.

In 1899 $6,000,000 of bonds were issued [2] along with $5,000,000 of 7 per cent cumulative preferred stock on which dividends were payable during the period of development.[3] Underwriters secured the bonds at 90, and each $500 bond carried the right of subscription to fifteen shares of stock at $15 per share.[4] An option of $80 per share on $2,000,000 of the preferred stock was reported.[5] There was

[1] See Appendix I.

[2] *Commercial and Financial Chronicle*, vol. LXIX, p. 553.

[3] *Monetary Times*, vol. XXXIV, p. 886.

[4] *Commercial and Financial Chronicle*, vol. LXXI, p. 122.

[5] *Ibid.*, vol. LXXII, p. 778.

undoubtedly an initial overcapitalization of from $7,000,000, to $8,000,000, omitting discounts on bonds and preferred stock. The $10,000,000 of common stock must have sold for about $1,500,000. The bonds were discounted for about $600,000. The preferred stock was sold at about 20 below par, a loss of about $1,000,000. In 1901 $5,000,000 more of common stock was issued at 60, involving a further overcapitalization of about $1,750,000.[1] As no depreciation account was provided until 1907 to 1908, the situation was further aggravated. The increased value of the Bell Island ore deposits is the only factor redeeming an over-capitalization that might be estimated as high as $11,850,000. Mr. William McMaster, Hon. H. Montague Allen, and Hon. Robert MacKay were members of the board of directors of the Montreal Rolling Mills, previous to its consolidation in the Steel Company of Canada.[2] Mr. McMaster is now a director of the Steel Company of Canada. Mr. T. J. Drummond, of the Canada Iron Corporation, who was a director of the Lake Superior Corporation after its reorganization in 1905, became president in 1908.[3] Mr. H. R. Drummond, Mr. G. E. Drummond, and Mr. Edgar McDougall were on the board of directors of the Cumberland Coal and Railway Company, prior to its absorption by the Dominion Steel Corporation.[4] In 1910 Mr. J. R. Wilson, of the Dominion Coal Company and Dominion Steel Corporation, was added to the directorate of the Nova Scotia Steel Company, together with Mr. K. W. Blackwell, of the Montreal Steel Works. Mr. Blackwell was supposed to be interested also in the Dominion Steel Corporation.[5]

A general survey of the 1912 directorates of iron and steel, railway and banking companies reveals the following

[1] *Ibid.*, vol. LXXIV, p. 530.
[2] *Canadian Engineer*, vol. 10, p. 84.
[3] Canada, *Reports on Mining and Metallurgical Industries*, p. 324.
[4] *Ibid.*, p. 363.
[5] *Monetary Times*, vol. XLV, p. 619.

facts: Mr. T. J. Drummond[1] was president of the Canada Iron Corporation and of the Lake Superior Corporation and was on the board of directors of the Cockschutt Plow Company and one bank. Mr. G. E. Drummond was on the boards of the Canada Iron Corporation, the Canada Car and Foundry Company, the Cockschutt Plow Company, and one bank. Mr. H. Cockschutt was on the boards of the Canada Iron Corporation, and was President of the Cockschutt Plow Company. Mr. Robert Hobson was president of the Steel Company of Canada, and was on the boards of a loan company and the Cockschutt Plow Company. Mr. C. A. Birge and Mr. C. S. Willcox, of the Steel Company of Canada, were also members of boards of directors of banks. Mr. H. S. Holt was on the boards of the Steel Company of Canada, the Canada Car and Foundry Company, and a bank; Hon. William Gibson, of the same company, had a place on the directorate of a bank and of a loan company. Mr. W. D. Matthews was a member of the boards of the Dominion Steel Corporation, the Steel Company of Canada, a bank, a loan company, a navigation company, and three railways. Mr. J. Hamilton Benn was the London representative on the boards of the Steel Company of Canada, the Canada Iron Corporation, and the Canada Car and Foundry Company. Mr. James Redmond was on the boards of the Canada Car and Foundry Company, the Canada Locomotive Company, and a bank. Hon. R. Jaffray was a director of the Nova Scotia Steel and Coal Company, a loan company, one bank, and a railway. Sir Max Aitken, the promoter, was on the boards of the Steel Company of Canada, the Canada Iron Corporation, the Canada Car and Foundry Company, and one railway. Mr. K. W. Blackwell was a director of the Nova Scotia Steel and Coal Company and the Canadian Steel Foundries. Mr. N. Curry was president of Canadian Steel Foundries and the Canada Car and Foundry Company,

[1] Ill-health has caused his resignation since 1912.

and a director of a bank and of a coal company. Of the directors of the three boards of the Dominion Coal Company, Mr. J. H. Plummer was president of all three, and was a director of one railway. Sir William Mackenzie was on one bank board, one railway board, and was president of the Atikokan Iron Company and a director of Moose Mountain, Ltd. Sir Henry Pellatt was connected with Steel and Radiation, a navigation company, and a railway company. Mr. J. R. Wilson was a director of the Canadian Steel Foundries, and the Canada Car and Foundry Company. Mr. H. M. Molson, Sir H. M. Allan, Mr. George Caverhill, Hon. R. Dandurand, Hon. R. Mackay, Mr. William McMaster, Sir W. E. Van Horne, Senator Cox, Mr. F. Nicholls, Mr. E. R. Wood, and Colonel James Mason were connected with banking and transportation companies.

§ 13. The question of the actual power of industrial combination in Canada is answered by a glance at the list of directors cited above and their relations to various companies, which indicates that in some way or other every company of any importance was related to every other. One director, Mr. Blackwell, of the Nova Scotia Steel and Coal Company, which seems farthest removed from the other large companies, could meet on the board of the directors of the Canada Car and Foundry Company, and its subsidiary Canadian Steel Foundries, directors of the Lake Superior Corporation, the Canada Iron Corporation, the Steel Company of Canada, the Dominion Steel Corporation, the Canada Locomotive Company, and the Cockschutt Plow Company. Furthermore, Mr. Blackwell was interested in the industrial end of these enterprises and his relation to each was no formal affair. Yet this grouping of directors from various interests in this company may simply indicate an attempt to insure friendly relations between that and the larger companies. Certainly, the Cana-

dian iron and steel industry is not "dominated" by the Canadian Car and Foundry Company. Often directors are chosen merely for their prominence in the financial interests of Canada. The interests of Sir Max Aitken, Mr. Henry S. Holt, Sir Henry Pellatt, Mr. W. D. Matthews, and Sir William Mackenzie, as well as Mr. J. Hamilton Benn, of London, England, are likewise chiefly financial. Mr. T. J. Drummond's relations to the Lake Superior Corporation, the Canada Iron Corporation, and the Canadian Car and Foundry Company were more nearly of an industrial character.

It is not to be understood that any one corporation, through the attachments of its boards of directors, controls all the other companies. The most one can say is that the relations are intimate enough to render improbable any severe competition between the various companies.

In fact, there seems to be little room for competition. The Steel Company of Canada controls nearly all the large bolt and nut and screw plants, and produces over fifty per cent of the nail output. The Nova Scotia Steel and Coal Company puts on the market a class of articles produced by no other large firm in Canada. The Canada Iron Corporation devotes its pig-iron output to the manufacture of car wheels and pipes, of which it has almost a natural monopoly because of the character of the pig iron produced. The Canadian Steel Foundries has consolidated two important steel-castings firms whose products are now used by the Car and Foundry Company. The Steel and Radiation, Ltd., competes with none of the large iron and steel companies; it simply receives raw materials for use in the manufacture of its own special line of products. The Canada Locomotive Company and the Cockschutt Plow Company are highly specialized concerns. The Atikokan Iron Company caters to the Western trade, and Moose Mountain, Ltd., ships ores to the United States.

The various large iron and steel companies in Canada

are each devoted to the manufacture of a special line of product, and, therefore, come into competition with only those companies or firms so small that they do not attract public notice. Competition or its possibility does exist in the wire and nail market between the Dominion Steel Corporation and the Steel Company of Canada, as well as with a few small firms which are able to secure a certain following trade. The Dominion Steel Corporation may compete with the Lake Superior Corporation in the rail market, and there might be competition in the pig-iron and steel-billet market were it not that the companies consume a large percentage of their own output. The United States Steel Corporation completely dominates the barbed-wire market since Canadian production has disappeared. Malleable castings are practically monopolized by a merger of the larger companies.

It is a safe conclusion that the Canadian iron and steel industry is rather successfully controlled in its various branches by the combinations producing such lines of products as have been described above. While there may be internal competition in the production of wire rods, wire, wire nails, and rails, it is never so serious as to depress prices unduly. The chief competition must, therefore, come from the United States Steel Corporation; but this competition is partially checked by duties and the dumping clause. In a few cases the United States Steel Corporation has been able to dominate completely the Canadian market at its own prices; for instance, in barbed wire, and at times in wire rods. No part of the Canadian iron and steel trade is in serious danger of destructive competition.

The possibility of an amalgamation of all Canadian iron and steel plants offers dangerous ground for prophecy. There is always the possibility that the principle of large-scale production and of integration of industry may shortly involve the various firms in a competition necessitating

further consolidations. The competition of the Dominion Steel Corporation and the Steel Company of Canada in the hardware trade is practically assured for the immediate future, and the United States Steel Corporation plant may strengthen this situation. A possible amalgamation would have to include the Canadian branch of the Steel Corporation. A merger programme of this character is a possibility, but it is impossible to predict the course of events. The rapid expansion of the market for nearly all iron and steel products indicates that there is no immediate necessity for such a policy.

§ 14. Custom and popular feeling attribute the trust movement to the tariff and other forms of protection. Since this supposed relation is likely to be much discussed in Canada in the near future, it is important to consider the relation of protection to the trust movement in Canada.

The earliest combines in the iron and steel industry in Canada followed overproduction and excessive competition in the early nineties. The tariff, together with the character of the business, overstimulated the hardware branch of the industry. At the same time the tariff gave the Canadian producers a reason to combine, assisted them to combine by limiting the number of competitors to the home producers alone, and permitted them, once they had combined, to raise prices behind the tariff wall. Many of these firms are now consolidated in the Steel Company of Canada, which produces finished goods that are protected by duties varying from 25 to 35 per cent. This company produces over fifty per cent of the Canadian output of nails; small manufacturers have an output of about thirty per cent of the Canadian product; and the Dominion Steel Corporation, with its ally, the J. Pender Company of St. John, produces the rest. As it is generally recognized, however, that the Dominion Steel Corporation and the Steel Company of Canada have an agreement to avoid competi-

tion, if possible, these large companies are probably getting the full benefit of the tariff.

The output of steel rails receives the full benefits of protection. As there are only two rail mills, which are said to market their product through a common selling bureau, there is no effective competition between Canadian firms. Two firms could easily come to agreement if there were danger of losing the value of the tariff through competition.

To the extent to which the different companies specialize, they are in a position to get the full benefit of the tariff. In this respect the Nova Scotia Steel Company, which produces practically all the large forgings made in Canada, seems specially favored.

The internal arrangement of the iron and steel schedule may have an effect on the integration movement in the Canadian iron and steel industry. What is the probability that a Canadian firm would undertake to produce steel rails without an efficient blast-furnace plant and steel furnaces? Obviously, while the duties on pig iron and on steel billets would put the independent companies at a disadvantage, the pig iron and billet departments of the Algoma Steel Corporation and the Dominion Steel Corporation would gain what their rail mills would lose from nominally increased prices of pig iron and billets. Any firm that did undertake such a scheme would shortly be forced to join forces with one or both of the mills previously in operation.

In the same way an advance of duties on pig iron and steel billets might also tend to push the movement for integration still further into all branches of the finishing industry, especially into lines in which the large companies with blast furnaces and steel furnaces already have a large output. Although integration of industry may have industrial advantages, the tariff, by increasing the cost of the raw materials of independent firms, would drive them off

the margin of profitable production and restrict competition.

This principle may be illustrated by the probable effects of the recent increase of duties on wire rods. It seems strange that the Dominion Steel Corporation and the Steel Company of Canada should need duties on wire rods when the large part of their output is turned into highly protected finished products in their own mills. The price of these finished products need not be, and in all probability will not be, higher than before, since the duties on these have not been increased. There is obviously no advantage to these companies in having their rod mills charge up their respective nail factories with higher prices for rods. The only apparent advantage in the duties is the possibility of raising the prices of rods to outside nail firms. If the rod mills succeed in so doing, the independent firms may be forced out of business and the two large companies could then get the full advantage of the tariff on finished products and on the raw material (rods) as well. Facing failure through higher costs of production, the independent firms may be glad to sell out to the larger companies.

During revision of the iron and steel schedule this point should be kept clearly in mind. Integration will no doubt continue to spread in Canadian industry, but it would be well that it should be based on industrial efficiency rather than on artificial tariff barriers on raw materials which force the smaller firms out of business and restrict the field of competition.

CHAPTER XI

THE CAUSES OF RECENT PROGRESS

§ 1. Not only is the iron and steel industry the modern barometer of trade, but its development reflects, probably more than that of any other industry, the influence of a network of industrial and economic factors. The influence of these in early periods we have already considered. Particular care has been taken in considering the effect of protection because it has been the subject of so much public discussion. Certain phases of the protective policy in the last two decades have been discussed so far as was possible, before outlining the growth of the industry. It is the purpose of this chapter, first to consider other causes of the recent progress, and then to estimate the influence of protection on the development of the industry in recent years. A final chapter will be devoted to considering whether or not the protective policy has been a wise one, especially during the last period of Canadian industrial history, and whether or not it should be retained or how it should be modified as the programme of the future.

§ 2. In the development of any industry the availability of raw materials is of primary importance, and in Canada this has been the most favorable condition. Nova Scotia has been able to develop an iron industry because of the unlimited supply of iron ore of satisfactory quality, and an unlimited supply of coal at points to which the ore can be cheaply carried. Though the furnaces at Bridgeville and at Ferrona have been abandoned on account of lack of ores, the Nova Scotia Steel and Coal Company has expanded its operations by building at Sydney Mines a blast

furnace to use coal from areas purchased in 1900, and Wabana ore previously used at Ferrona, but more conveniently shipped to the coal areas at Sydney Mines. Likewise, the Sydney establishment has been made possible by the existence of the Newfoundland ore supplies and the Glace Bay coal areas, conditions which, as we have seen, would have assured the building of an important iron and steel plant whether or not the bounties had been renewed in 1899.

Furnaces were built at Sault Ste. Marie under like circumstances. The discovery of the Helen Mine inspired the addition of a new department to the "Soo" industries. Unfortunately the ore did not turn out to be of Bessemer quality, but the industry, once begun, was carried on to success by using American ore secured in the Lake Superior region. More recently, since basic open-hearth furnaces have been installed, it has been decided that the Helen Mine ore is too valuable to sell to outsiders. The Atikokan Iron Company was incorporated after the discovery of ores west of Port Arthur, and the Midland Furnace was built in 1899 to use Helen Mine and other Ontario ores. The industry of Quebec is based on bog ores that produce iron of very superior quality, and what little success the Londonderry plant has had was based on the mixture of a number of Canadian ores. The availability of foreign ores and the admission of iron ore free of duty has been of great advantage to the primary industry in Canada. Notwithstanding the difference in the bounties on iron made from native ore and iron made from foreign ore, the annual output of iron made from native ore has amounted to only 62,000 tons in 1894, 20,000 tons in 1898, 130,000 tons in 1910, and 53,000 tons in 1911, while the production of iron made from foreign ore has steadily increased from nothing in 1894 to about 600,000 tons in 1910. There is some evidence that Canadian ore will be used more extensively in the near future, especially in Ontario, where ores are most

accessible. In the past there has been [1] a considerable exportation of Canadian ores, amounting to more than the quantity of native ores charged to the furnaces between 1902 and 1907, but in recent years the tendency to export Canadian ores is diminishing. While about half of the foreign [2] ores used have come from the Lake Superior regions and half from Newfoundland, the rapid growth of the Ontario industry of recent years puts a premium on the use of American ores.

It is a safe conclusion that the Canadian industry would not have been an important one, had it not been for the discovery of the Michipicoten, and especially the Wabana, ores, as well as the availability of American ores.

Related to this condition of development was the great supply of coal, especially in Cape Breton, which supplies about half of the coke charged to the furnaces.[3] The desirability of securing new markets for the output of the coal of the Cape Breton areas was a reason for beginning the Sydney industry. The importance of this supply of fuel is revealed by the facts that in 1900 the Nova Scotia Steel Company purchased the coal areas of the General Mining Association, and that since 1909 the Dominion Iron and Steel Company has secured control of the Dominion Coal Company and the Cumberland Coal and Railway Company.

Ontario is situated somewhat differently from the Maritime Provinces, and is practically dependent on imported coal or imported coke. Little or no coal finds its way from Nova Scotia to Ontario for smelting purposes. Ontario has

[1] See Appendix G, and Appendix B, Table IV.

[2] The amount of Newfoundland and of American ore used:—

Calendar year	From Newfoundland (tons)	From the United States (tons)
1910	685,117	681,918
1911	779,282	849,086
1912	956,469	1,052,696

[3] See Appendix B, Table IV.

been dependent on the United States. This scarcity of fuel which the Ontario industry had to face in early years has made possible the carrying of coal to plants which are located in a large and growing market area in Ontario. Coal and coke can be brought from Pennsylvania, Ohio, or West Virginia to Canadian ports on the Great Lakes almost as cheaply as to American ports. For this reason the Algoma Steel Corporation purchased coal areas in West Virginia in 1911. The admission of coking coal for smelting purposes, subject to the drawback of 99 per cent of the duty, has no doubt been a distinct advantage, especially to the Algoma Steel Corporation, which found it possible to build coke ovens at its steel plant at Sault Ste. Marie. Coke itself has been on the free list for the benefit of all Canadian manufacturing industries.

§ 3. It is a common feature of economic development that changed technical conditions [1] of an industry are reflected in the lagging or in the progress made by the industry of a particular country. England long held supremacy in the iron industry because of unsurpassed fuel supplies. The younger industry of the United States, handicapped by a later start and widely separated natural resources, won the ascendancy by a concentrated study of intensified production, the use of mechanical applications and labor-saving devices, and the assistance of cheap transportation.

A part of this progress has been due to changes in the methods of producing iron and steel, and these developments are favoring the growth of the Canadian as well as the American industry. The iron first produced in Canada, as in the United States, was charcoal iron. Even at the present time three or four Canadian furnaces produce a small output of this kind of iron. In 1899 the Canada Iron Furnace Company planned to use charcoal as fuel, and the

[1] See J. R. Smith, *The Story of Iron and Steel*, and Chisholm, *Commercial Geography*.

Algoma Steel Company built charcoal furnaces as late as 1902, but both of these companies have found the use of coke more advantageous. As a matter of fact, the iron industry is past this stage and, except under conditions where the product is of exceptional quality or the supply of charcoal unusually good and cheap, the use of charcoal is really a detriment to the industry. The next great technical development was the use of coke. This gave supremacy in iron-making to western Pennsylvania, and Pittsburg became the capital of the iron world in what might be called the "Connellsville Coke" epoch. More recently it has been found possible to use coal of poorer quality than that found in the Connellsville district. As a result, the area of successful blast furnaces of the most modern type is spreading, and Nova Scotia measures have thus been included in the supply of coal of coking quality, much to the advantage of the Canadian iron and steel industry.

As iron ore is rarely found pure, the iron, when run off and moulded into pigs, always contains too high a proportion of carbon, and sometimes of sulphur and phosphorus, which are injurious to its quality. It is because of excess of carbon that cast iron is converted into wrought iron or malleable iron through eliminating some of the carbon by a process called puddling.

By 1870 the Bessemer process of making steel had been well developed. Steel contains less carbon than cast iron and more than wrought iron, and is, therefore, less easily bent than wrought iron, and less easily broken than cast iron. Hence, it is particularly well adapted to modern necessities, and between 1880 and the present time it has practically taken the place of bar iron in the finishing industries.

By the Bessemer process the molten pig iron is run into a large pear-shaped vessel, a converter, through which air is forced until the carbon is all consumed. Then the compound of iron, containing the necessary amount of carbon,

is added and mixed by blowing. Ferro-manganese is added to make the steel less brittle. Unfortunately, although sulphur can be eliminated by the use of a limestone or basic slag and a very high temperature in the smelting of the ores, or by roasting ores before they are charged to the blast furnace, phosphorus, an impurity quite common in Canadian ores, cannot be controlled by the smelting-master. Yet a small amount of it is practically ruinous to iron, making it brittle. For a long time, therefore, many otherwise good ores were useless. Newfoundland ores and the Helen Mine ores contain a considerable amount of phosphorus, and were only made available for steel-making by recent inventions.

The first invention to meet this difficulty was made in 1878, when the so-called basic Bessemer process was devised.[1] Many American ores are, however, either too low or too high in phosphorus to be classed as Bessemer ores at all. Fortunately for Canada, these non-Bessemer ores are not completely useless. In 1856 Messrs. Siemens took out patents for the open-hearth process of steel-making, and in 1864 improvements were made by a Frenchman named Martin. This Siemens-Martin process differs from the Bessemer process in that flames play over the molten metal instead of being blown into it. As the fuel supply is entirely independent of the iron, the process can go on so long as is necessary. Meanwhile it is under perfect control, and samples of the product can be taken and examined, and the contents of the furnace changed until the steel is satisfactory. The process takes more time, and is more costly, but the quality of the product is more uniform. Because of these features, combined with the application of the principle involved in the basic process, the basic open-hearth furnaces have been able to use a large amount of otherwise worthless ores. Practically all Canadian steel furnaces are of the basic open-hearth type. The Dominion Steel Cor-

[1] A limestone lining is used to extract the phosphorus from the iron.

poration, after some loss on expenditures for Bessemer furnaces, installed the basic furnaces, which were more suitable for treating the iron made from Newfoundland ores. Likewise, as the Helen Mine ores were of a kind that required the basic process, the Lake Superior Corporation installed basic furnaces and is now using its own ores from the Helen Mine, the output of which it shipped previously to the United States. Nearly all other Canadian steel furnaces are of this basic open-hearth type for which Newfoundland ore and Helen Mine ore are well adapted. This fact, combined with the relatively high price of open-hearth steel, and the rapid expansion of the open-hearth output, helps to explain the great development of the Canadian industry and speaks well for its future, whether or not tariff or bounty protection is granted.

§ 4. Before considering the desirability of the protective policy from the point of view of the consumer, it may be wise to point out the influence of the Canadian market on the development of the industry. That the market has developed need scarcely be emphasized. An expansion of railway mileage by 10,000 miles in sixteen years would of itself be ample evidence of increased consumption.[1] More definitely, the consumption of iron and steel of all kinds increased from about $40,000,000 annually for the period from 1881 to 1896 to about $170,000,000 in 1910, and the prosperity of recent years, 1910 to 1913, has raised the annual consumption to over $250,000,000.[2] In other words, the consumption increased in value over four times from 1896 to 1910 and over six times by 1913. The consumption of pig iron increased from about 110,000 tons annually for the period 1891 to 1896 to 912,371 tons in 1910 and 1,280,176 in 1913.[3] The consumption of steel ingots, billets, and

[1] See Appendix A.
[2] See Appendix G, Table I, and Appendix C, Table II.
[3] See Appendix B, Table I.

bars has rapidly increased from about 25,000 tons annually for the period 1894 to 1900 to over 200,000 tons annually in 1902 and 1903, and to nearly 1,000,000 tons in 1912.[1]

The value of this home market to the Canadian products varies from time to time, as the varying amounts of the imports show. In times of depression the market is less extensive, and there is more danger of American competition and a decrease in prices. For instance, the wonderful revival of the iron trade in the years 1897 to 1899 brought with it an advance in price [2] which was most beneficial to the Canadian industry. Railways that had been economizing for a few years began to make large expenditures and the United States steel mills had not the capacity to supply the demand. It was during this period that the "Soo" Mills, the Dominion Iron and Steel Company, the Midland Furnace, the Hamilton Steel Furnaces, and the Deseronto Furnace were built. The years 1899 to 1902 were auspicious years for the development of an iron and steel industry.

Although the depression of 1907 to 1908 somewhat curtailed the market, the Dominion Iron and Steel Company was able to find purchasers abroad. Rapid railway construction soon revived the demand and the Canadian companies have ordinarily found the market quite favorable.

§ 5. Probably the most striking sign of industrial progress in recent years is the increasing size of industrial enterprises, and this feature is of considerable significance in the recent development of the Canadian iron and steel industry.

The manufacture of iron and steel requires the investment of a very large amount of capital. Most modern steel companies own and operate not only blast furnaces, but also ore deposits, coal measures, coke ovens, steel-making furnaces, and finishing mills of various kinds. The com-

[1] See Appendix B, Table VI. [2] See Appendix H.

panies that produce only one primary product are of little importance in Canada, and their history has not been marked by conspicuous success. Such companies as the Dominion Steel Corporation, the Lake Superior Corporation, the Canada Iron Corporation, and the Steel Company of Canada own and operate mines, coke ovens, blast furnaces, and steel furnaces, and usually manufacture several lines of finished articles.

A policy of industrial integration once adopted involves the constant problem of working out a well-balanced and coördinated plant through the adjustment of one department to another. In practically no case, however, is a backward move made, and this modern principle of economic organization becomes a dynamic force to develop and expand an industry, which has already proved a success, into a most efficient establishment. Just here a few Canadian illustrations may be of interest. For instance, the "Soo" steel and rail mills were closed down in 1902, owing, in part, to the lack of a supply of pig iron, and the company found itself forced to build more blast furnaces to supply pig iron at a cost lower than the price that would have been paid were the iron purchased in the open market. New open-hearth furnaces and coke ovens were added for the same reason. In more recent years the company found the supply of iron ore sufficient to justify an addition not only to the primary, but also to the finishing, stages of manufacture.

The history of no other company reveals this principle better than that of the Nova Scotia Steel and Coal Company. The production of finished articles has always been the strong feature of this well-known company, and its business has steadily followed that increase in the market which we have already considered. This has necessitated the continuation of a policy begun as early as 1882. At that time it was decided to build a steel plant to supply steel to the Nova Scotia Forge Company. More recently

the building of the Sydney Mines blast furnace in 1902 became absolutely necessary, if the more advanced lines of business were to be continued. The supplies of pig iron and of steel have made possible the extension of the business into every field in which the company has believed it could make a profit.

The prosperous organization of the business of the Dominion Iron and Steel Company has called for continual readjustment for increased business. Some pig iron was exported for a year or two until the finishing mills could be put in satisfactory running order. The addition of a rod mill, even before the bounties on rods were granted is a splendid illustration of this principle, which was exemplified again in 1911 and 1912 by the building of mills to use the wire rods in the manufacture of finished articles. The constant additions, made to various branches of the plant from time to time, illustrate this growing tendency to reduce costs to meet market competitors by adding to the plant. This same policy has been followed by the Hamilton Company in the construction of steel furnaces, an additional blast furnace, and also rod mills to supply the necessary raw materials to the plants now controlled by the Steel Company of Canada.

This is no theoretical explanation. The Dominion Steel Corporation has adopted the conscious policy of reducing costs by extending its plant in order to place itself in a position to stand the gradual loss of bounties. For instance, Mr. Plummer, the president, said in his 1911 Report: "It is no use shirking the fact that it will hurt us in many ways to have our rod business disorganized (by the passing of the bounties), but, as we said in our report, we have every confidence that the effect will be overcome when the plant is completed. By this we mean the completion of the wire and nail mills which the changed conditions make it necessary for us to erect. This will take time, and even when complete they will not for some time

give full employment to our rod mill, but we have no doubt of our ability to finish in marketable form all the material we can turn out." [1] In 1912 the results of the policy were being realized. This same principle was avowedly applied in the development of the blast furnace and steel mills in preparation for the loss of bounties on pig iron and steel billets.[2] Strangely enough, the loss of bounties appears to have forced the corporation to see the value of large-scale production and integration of industry, and in this way actually developed the industry.

§ 6. Most of the fundamental conditions of the recent development of the Canadian iron and steel industry have already been considered. The availability of resources, the growth of the market, and the introduction of large-scale production seem of especial importance; indeed, the direct connection of these factors with the progress of the industry is obvious.

A number of other conditions have been favorable to recent developments. Large-scale production has been made possible by the availability of an increasing amount of British and American, as well as Continental and Canadian, capital. Indeed, the great danger is that Canada may have been over-borrowing. However, sound industrial enterprises, conservatively financed, should not fear the future. The Nova Scotia Steel and Coal Company has always been favored with ready financial recognition. The Dominion Iron and Steel Company was less fortunate for a period of years, but it is undoubtedly true that recent years have seen a return of financial favor due, partly to the ending of the previous conflict and uncertainty over the coal contracts, and partly to more conservative management by Canadian financiers.

Recently there has been a tendency to emphasize the importance of management in Canadian industry. Since

[1] *Annual Report*, 1911, pp. 8–9. [2] *Ibid.*, 1912, p. 10.

1903 the management of the Dominion Iron and Steel Company has been aggressive, yet efficient, as compared with the extravagant and almost ignorant operations of the first manager. Since 1910 there has been a further change in the direction of a more efficient organization of the whole steel corporation business under Mr. M. J. Butler. The Nova Scotia Steel Company and the various establishments carried on by the Drummonds and the McDougalls have always been models of good management, and there is no doubt that the industrial operations of the Steel Company of Canada have been and will continue to be properly conducted. The Consolidated Lake Superior Company failed largely because Mr. Clergue had little technical knowledge, and because his unbounded and somewhat unbalanced imagination led him into the most extravagant forms of finance. Under the control of Mr. T. J. Drummond and his assistants, the Lake Superior Company has been gradually regaining for the "Soo" industries the respect of the Canadian public.

The labor supply in Canada, too, has become more satisfactory. The Dominion Iron and Steel Company brought men from England until the work could be taught to Canadians. At the present time there is a satisfactory supply of skilled labor, and immigration is continually supplying recruits for the ranks of iron and steel workers. The strikes at the coal mines in Nova Scotia were for a long time a source of trouble, but the Dominion Steel Corporation has apparently secured entire control of this situation in recent years.

§ 7. Most of these fundamental conditions were as favorable for the growth of the Canadian industry as for the growth of the industry in the United States, so the Canadian industry was not in danger of severe competition. The Cape Breton industry was especially favored by location near coal fields to which ores can be cheaply

brought by water. It is near the European market; it can ship by rail or water to the market in Quebec and Ontario or the Maritime Provinces. The industry on the mainland of Nova Scotia, especially at Londonderry, as well as the primary industry at Trenton and New Glasgow, has not been a success because of lack of ores. The Quebec industry has been handicapped by the lack of local ore and coal. Most Quebec ores contain titanium, which makes them hard to smelt; as yet no satisfactory process for working such ores has been put in operation.

The Hamilton Furnaces are situated in the center of a large and growing market area. Hamilton is favored by adequate transportation facilities, both by water and rail, and ore and coal can be laid down at Hamilton almost as cheaply as at other Lake ports. The industries at the "Soo," at Midland, and Port Arthur are more favorably situated for the supply of coal than the recently built furnaces at Duluth, and they can secure ore at a cost almost as low as the furnaces at Duluth, and certainly at a lower cost than can furnaces at Lake Erie ports or in Ohio or Pennsylvania.

In general, labor is as cheap and as efficient in Canada as in the United States. Capital is now as freely offered; the Canadian market is expanding very rapidly; technical developments favor the Canadian industry; and ore, coal, and coke for smelting purposes are admitted free of duty. Although the Canadian market is much smaller than the American market, and the scale of operations is smaller, Canadian disadvantages of the earlier periods have, to a very considerable extent, disappeared. Practically all the Canadian furnaces would rank among the number of furnaces in operation in America in a time of ordinary industrial conditions, even if protection were abolished.

§ 8. On *a priori* grounds there is room for assuming that protection has assisted the Canadian iron and steel indus-

try by maintaining prices and, therefore, augmenting the Canadian output by the addition of a few small plants. If prices are kept up by the tariff, or if higher costs of production are offset by bounties, new competitors are enabled to enter the field, or inferior and antiquated plants may be kept running at a profit. It is more difficult to prove that the determining factor in the building of iron and steel plants has been either the bounties or the tariff, but we can recall whatever evidence we have had of the coincidence of the landmarks of progress with the granting of duties and bounties.

In the first place, several of the now prominent iron and steel industries were already in existence in 1897. The Nova Scotia Steel Company, the Hamilton Blast Furnace Company, the Canada Iron Furnace Company, as well as many smaller establishments, had already a fairly important business. In spite of the decrease of protection in 1897, these continued to prosper and expand. The Nova Scotia Steel and Coal Company built furnaces at Sydney Mines in 1902, at a time when the bounties were about to decline.[1] This Cape Breton industry would have grown up whether or not bounties had been granted. From time to time furnaces have been built and finishing mills added with little or no reference to changes in the tariff. Likewise the Canada Iron Furnace Company built a furnace at Midland in 1899, before the renewal of bounties was assured, and in 1909 another furnace was added, when the bounties were about to disappear. In like manner the Hamilton Company continued to expand, even though it found itself unable to use as much Canadian ore as it had expected, and therefore failed to obtain the higher bounty. A steel plant was added in 1900, after the reduction of duties on billets had been but partially compensated for by an increase of the bounties on billets from $2 to $3 per ton, and in 1906 an additional blast furnace was decided upon

[1] Mr. Graham Fraser's letter to Mr. W. M. Whitney, *re* bounties.

even before the extension of the bounty system was assured. The years 1911 and 1912 have seen the addition of rod mills after the disappearance of bounties when the recent grant of tariff duties on rods was by no means assured.

Since the reduction of protection in 1897 much progress has been made by entirely new firms and in altogether new centers. Even before the bounty legislation of 1899 was passed, the Dominion Iron and Steel Company had purchased iron-ore deposits and had located the site of the proposed works at Sydney; the brickwork of the blast furnace was finished three months after the Bounty Act had been passed. There is evidence that building operations were actually delayed in order that the Government might feel more responsibility for the renewal of the bounties. Thus it appears that the bounties in that respect actually retarded development. Since 1902 blast and steel furnaces, rolling mills, and finishing mills have been added from time to time. Blast furnaces were built from 1910 to 1912, when it was known that the bounties would end; a rod mill was built, even before bounties were paid on wire rods; the building of the rail mill in 1904 depended upon the possibility of rounding out the plant rather than upon the tariff duty imposed in 1904. Both the rod and rail mills were planned long before protection to those branches of the industry had been assured. Nail and wire mills were built in 1911 to consume the output of the rod mill. The company hoped by thus extending the scale of operations to offset the loss of bounties by reducing the cost per unit of product, so it seems that the reduction of protection actually forced further additions to the plant. It was an avowed policy of the Dominion Iron and Steel Company to expand the plant and thus reduce costs in order to meet the gradually increasing competition as the bounty payments shaded off. In short, the growth of the Dominion Iron and Steel Company is a story most adverse to the merits of the protectionists' claims.

The Algoma Steel Company's first furnaces, together with a rail mill and a structural steel mill, were built in 1901 to 1902. The rail mill was first put in operation in 1902 on a contract for rails for the Dominion Government, but notwithstanding the extraordinary price paid for the rails, the whole plant, including the pulp, paper, steel, and chemical mills, the mines, the railways, and the power plant, was closed down. Duties were not imposed on steel rails until 1903. After a much-needed financial reorganization, the company has made rapid progress. The addition of coke blast furnaces and open-hearth steel furnaces since that reorganization has been due to industrial causes rather than protection. Since 1910 the building of new mills and plants has been regarded as a necessary move to meet the effects of the loss of bounties. The United States Steel Corporation recently decided to build blast furnaces, steel furnaces, rod, rail, and finishing mills at Sandwich, Ontario, in spite of the fact that the bounties were no longer payable.

Since 1897 a few small establishments have been put in operation for various reasons. The Deseronto Furnace was built in 1898 because the United States Tariff of 1897 had imposed a duty on charcoal, and a new market for charcoal made at that place seemed necessary. The Port Arthur Furnace was planned as early as 1904, when it seemed that the bounties would shortly disappear. The construction work was done in 1906 and 1907 before the renewal of bounties was finally decided upon. The bounty system failed signally to stimulate the use of native ores. The revision of the tariff in 1914 may put an end to an artificial delay in building mills for the production of heavier sections of structural steel, but it is not apt to lead to the building of additional rod mills so long as the present mills are capable of supplying the Canadian demand.

There seems to be little evidence of the direct constructive influence of protection on the recent growth of the

Canadian iron and steel industry. One might argue that the protective policy was applied to the primary industry under especially favorable conditions, and was, therefore, a success, even though the actual amount of protection was being gradually reduced. One might also claim that higher protection would have developed a still larger industry. Certainly, such conditions as the supply of raw materials and the size of the market were much more favorable than during the earlier period.

This is not, however, equivalent to saying that protection alone was responsible for the growth of the industry; that it was the chief favorable factor; that the industry would not have developed without protection; or that higher protection would have resulted in the growth of a much greater industry. It would be a mistake, however, to say that protection had not been of any value to producers of iron and steel in Canada, or that it had not stimulated to some extent the growth of the industry. A great number of influences, some of them interrelated, affect the development of an industry. Although protectionists have usually assumed that protection alone should receive the credit for the growth of the industry, there is little evidence in favor of such an assumption. It may have actually handicapped the industry at times by encouraging overcapitalization and by directing attention from industrial to political matters. The network of other favorable conditions would have permitted the growth of the greater part of the present industry, even without protection. Higher protection would not have resulted in the growth of a much greater industry than at present exists in Canada.

Since 1900 about eighty per cent of the annual consumption of pig iron in Canada has been produced within the country. Certain special grades of iron could not have been produced in Canada except under the protection of very high duties. If we add to this amount of special iron that iron which has entered Canada practically free of duty, for

use in the production of certain goods, we can see that the Canadian industry could not have been much more prosperous than it was. Fourteen of the largest furnaces are capable of producing more than the annual consumption of pig iron in Canada, even if the demand for special qualities of pig iron is transferred to the ordinary product.

In general, the total consumption of steel billets has been largely supplied by the Canadian output, which amounted to about 1,000,000 tons in 1912 as compared with imports of about 90,000 tons.[1] Even if the Canadian industry had produced the additional nine per cent of the annual consumption, it would not have been much more important than it is to-day. In all probability, as in the case of pig iron, a certain part of this nine per cent could not have been produced in Canada even under high protection, since there is a certain demand for extraordinary qualities of steel, especially for the manufacture of tools.

The effect of protection on the various lines of the finishing industry is more difficult to determine. While the amount of iron and steel consumed increased very rapidly, the Canadian manufacturer failed to produce as large a percentage of finished products as of primary products. In the period 1891 to 1896, nearly two thirds, in 1900 slightly over one half, and in 1910 nearly two thirds of the annual consumption was produced in Canada.[2]

These figures are not, of course, so significant as might at first appear. Much depends on the conditions of the particular branches of the industry. For instance, a large part of the steel-rail industry probably would have been developed without protection, since Canadian railroads are glad enough to carry their own rails. Protection did not have a very direct effect on the introduction of the industry. About ninety per cent of the annual consumption

[1] See Appendix B, Table VI.

[2] See Appendix C, Table II, and Appendix G, Table II.

of steel rails is produced in Canada, and the Canadian mills are capable of supplying the Canadian demand except in extraordinary years. Certainly, the production of steel rails would not have been much more successful had higher protection been given. Although protection had a considerable value in the early years of the industry, in recent years the Canadian mills have been so successful that protection might have been reduced without injuring their business as much as the high duty has hampered the building and maintenance of railways in Canada.

The manufacture of steel rods was proposed and begun before bounties were offered, and in 1912 and 1913 the Steel Company of Canada added rod mills when the bounties had disappeared and duties did not seem to be forthcoming. The Canadian mills are capable of supplying all the Canadian demand; certainly, they are assured of the larger part of the demand for wire rods, since they use an increasing amount of their rods in their own finishing mills. A certain part of the demand for rods, that for the manufacture of certain kinds of wire, may be supplied from the United States unless the Canadian mills are willing to let outsiders have wire rods at a price as low as the expense of supplying rods to their own finishing mills, or as low as other firms are willing to accept for rods.

The lack of protection, together with other unfavorable conditions, injured several industries, such as the tinplate industry. The abolition of protection for makers of barbed wire has apparently ruined their business. No doubt discrepancies in the wording of tariff items retarded the production of certain goods, as, for instance, structural steel weighing over forty-five pounds per lineal yard. On the other hand, if manufacturers of agricultural implements have been at a disadvantage by reason of the reduction of protection, it has not been apparent, since they are well known in the markets of the world and as Canadian exports exceed Canadian imports. Yet the rapid devel-

opment of Canada has resulted in a very great demand for articles which are grouped as manufactures of iron and steel, such as agricultural implements, cream separators, cutlery, threshing machines, gas and steam, portable and stationary engines, typewriters, mining machinery, etc.; all highly finished products. In fact, about half of Canada's imports are composed of such articles. In times of prosperity, when imports of iron and steel are apt to be large, the Canadian mills are unable to keep up to the Canadian demand. The unusual extent of railway construction, building, and other work in special years has frequently resulted in an extraordinary importation of certain iron and steel goods. It is proverbial that a good crop in western Canada leads to vast purchases of agricultural implements.

With the exception of those producers who may import iron and steel subject to drawbacks of the duty, the prices of the primary products — that is, the raw materials used by the manufacturers of finished products — have been higher than they might have been. Fortunately the dumping of American products has kept the price of pig iron and steel lower than it might otherwise have been. Nevertheless, those who want the drawback system continued and those who want it abolished agree that the duties are of some value to the producers of pig iron and steel and a detriment to producers of finished goods.

In considering the possible effects of high protection, we ought to notice, too, that a great part of the demand for iron and steel goods is scattered over a great many items. The demand for special finished products, such as gas engines, is apt to be so limited in Canada that one small plant might supply the whole demand. The manufacture of many finished products is also affected by control of patent rights, and consequently, until the demand for such products becomes more extensive, production is apt to be carried on in American or British factories and

mills. The sum total of imports of all such highly specialized articles may, nevertheless, be very great.

While we have not enough information on which to base a detailed estimate of the effect of protection on many articles, yet we can say that some industries have been handicapped by the lack of protection, some have been handicapped by the duties on the raw materials, pig iron and steel, some would not have developed even had higher protection been granted, and some would have realized a considerable development even if the protective policy had favored them less than it did.

In general, one may conclude that the primary industry grew up largely because of favorable industrial conditions, rather than because of protection, and certain branches of the finishing industry did not grow up because the duties on pig iron and steel increased the cost of production, or because protection was not high enough for this stage of Canadian industrial history. In short, it would have been desirable to reduce or abolish the duties on certain primary products and to avoid protection to certain finished products, and at the same time it would have been advisable to give more protection to the producers of certain finished products.

CHAPTER XII

CONCLUSION

§ 1. Canada has been an iron-producing nation since 1730, but for many years the industry was very small, and most of the furnaces that were built did not remain in blast for a long period. On very few occasions before 1879 were more than three furnaces in blast at once. At the end of the period prior to the adoption of the "National Policy" in 1879, there were only two furnaces in blast in Canada, and of these the one at St. Maurice Forges was soon abandoned, and the other at Londonderry was not a financial success.

Yet one should not expect too much of the industry in this early period. Canadian industry in general was lagging behind that of the United States. Climatic conditions were unfavorable; there was an insufficient supply of labor because of emigration to the United States and the absence of a large immigration from Europe; transportation facilities were inadequate; markets were limited, and there was a lack of capital for industrial enterprise. Where general industrial development was so tardy there could be little demand for iron and steel. Although the building of railways in the sixties and seventies increased the demand and stimulated the building of mills for the manufacture of railway supplies, this demand was never large enough to require anything like the output of modern industry. Moreover, previous to 1879 the iron industry received very little protection, and British and American iron-makers were able to secure a large part of the existing market. The lack of large bodies of ore and the absence of good supplies in certain sections of the country placed such industry

as was attempted under still greater disadvantages. What few establishments were started from time to time existed under a combination of especially favorable conditions, and lasted only so long as those conditions continued. In such circumstances high protection would have been a mistake, indeed.

Practically the same general conditions of growth held for the next period from 1879 to 1897. There was no remarkable expansion of the Canadian industry for obvious reasons. The market was still a limited one, and the protection afforded the iron and steel industry could not have stimulated a large increase in production, even if the whole demand had been supplied by Canadian firms. What growth did take place can be attributed largely to a certain expansion of the market, especially that which followed the railroad building of 1880 to 1884, and the general prosperity of the period from 1887 to 1894.

During this period the duties on most iron and steel goods were increased, especially in the year 1887, but they were decreased again in 1894. The bounty system was introduced in 1883 and was continued and extended in later years. Protection, which probably cost the consumers of iron more than the price of a plant adequate to produce all the Government's demand for iron and steel, failed to develop an important industry. Protection of the finishing industry did develop certain branches; in fact, the output became so excessive that combinations were formed to restrict production and to maintain prices. Duties on such products might have been reduced more than they were in 1894.

The most rapid growth of the Canadian iron and steel industry has occurred since 1897; a period of gradually reduced protection. Although the annual consumption of pig iron is about twelve times as large as in 1896, Canadian blast furnaces now produce an average of over 80 per cent of this demand, as compared with an average of

about 30 per cent for the period from 1884 to 1892, and 60 per cent for the years 1893 to 1900. The output of steel now supplies about 90 to 95 per cent of the Canadian demand, although that demand has increased from about 20,000 tons in the nineties to about 1,000,000 tons to-day.

This remarkable growth has been caused largely by the new conditions of the industry. The discovery and use of Newfoundland ores, together with the availability of Cape Breton coal, has made the Nova Scotia industry not only possible but profitable. The discovery of the Michipicoten ores in Ontario stimulated the building of the "Soo" Mills, even though chief use has been made of American ores. The availability of capital for industrial, as well as railway enterprises, the increased labor supply, and efficient and aggressive management were additional favorable conditions.

The years 1906 to 1914, and especially 1911 to 1914, have been a period of organization of industry, partly through the amalgamation of companies, but more especially through the rounding-out of the plants into more efficient establishments producing finished as well as primary products. In this regard the passing of the bounty system seems to have been of more importance than the original granting of this form of assistance. That a large part of the present iron and steel industry would have been developed, whether or not protection had been provided, has been quite apparent. The fact is that the gradual scaling down and final disappearance of the bounties has forced the companies to put their enterprise on a more efficient basis. One may fairly question whether the bounty system has not even postponed the adoption of modern organization of the iron and steel industry. At all events, it is quite clear that recent competition from without, and, so far as it exists, from within, the country, has been a dynamic force for progress.

In recent years the people who are interested in the pri-

mary industry have been urging that the present policy favors producers of finished products without developing the primary industry. The reverse is the case. While from 80 to 90 per cent of the Canadian consumption of pig iron and steel billets is made in Canada, only about 65 per cent of the consumption of iron and steel of all kinds is supplied by Canadian mills. Probably not more than 55 to 60 per cent of the demand for finished products alone is satisfied by the output of Canadian mills. Undoubtedly general industrial growth has involved a large demand for iron and steel products. The increase of railway mileage has not only widened the market area, but has also added to the direct demand for finished iron and steel goods in the form of railway supplies. The growth of agriculture, mining, and manufacturing has created an extraordinary demand for machinery of all kinds, much of which had to be met by importation. The lack of protection was partly responsible for the failure to develop certain branches of the finishing industry, while, on the other hand, the duties on the primary products were a burden on those manufacturers who did manage to secure a hold on the market. Whether or not protection was responsible for the growth of the finishing industry, or whether or not higher protection would have developed the industry more fully, depends on the particular conditions of the various branches of the industry.

§ 2. A discussion of the wisdom of the protective policy of the last sixteen years includes a consideration of several things. Some of these we have already discussed and the conclusions need only be summarized. In the first place, the political necessity for the reduction of the tariff duties on the primary raw materials was supplemented by the fact that there was a sound economic reason for such a reduction of protection. The justification for this statement need scarcely be repeated. It is enough to say that

cheapness of raw materials is as important to manufacturers of the more highly finished products as are protective duties on those finished products; and a reduction of duties on primary products makes possible a reduction of the duties on finished products.

For this reason the bounty system was preferable to duties on pig iron and steel billets. Whereas duties would have kept up the price of iron and steel, bounties gave assistance without increasing the price. It is surprising that the duties were not entirely superseded by bounties. To the extent that the bounties were unnecessary, the system represented an uncompensated cost to the Canadian Government and to the Canadian people in general.

Assuming, then, that the policy of having cheap raw materials for the production of the finished products, adopted by Mr. Fielding in 1896, and accepted by Mr. White, the new Finance Minister of the Conservative Government, was politically and economically sound, the British preference, so far as it reduced the amount of protection granted, was a step in the same direction. Likewise, the drawback system and the exemption from duty of iron and steel for use in the manufacture of iron and steel goods reveal this same interest in cheap raw materials, and, notwithstanding the criticism of those interested in the primary industries, there is little expectation that iron and steel of a kind not made in Canada will be subjected to duties so long as the manufacturing consumers have such a large economic and political influence. A rebate of duties paid has been given certain manufacturers whose products have received little or no protection; as, for instance, agricultural implements, and certain kinds of wire. These favors have apparently been necessary in Canada, since producers of agricultural implements seem to bear the burden of most of the farmers' criticism of high protection. Drawbacks of the duties on coal and coke used in the smelting of iron have favored the primary industry in Ontario

without injuring the coal industry of Nova Scotia. The admission of iron ore free of duty was a similar desirable benefit to the primary iron and steel industry in Canada.

The dumping clause was a violation of this principle. Had it succeeded in relieving a special disadvantage of the Canadian industry, it would have resulted in such an increase of the cost of producing finished products in Canada as might have ruined the finishing industry. The large producers of pig iron and steel billets turn a great part of the product into finished goods at their own mills. Although the duties on such raw products are no disadvantage to these finishing mills, they may be a serious disadvantage to the firms which produce finished products alone. This has been illustrated already by reference to the duties recently imposed on wire rods, and to the way in which duties on pig iron and steel billets may have retarded the production of finished products by independent firms. Accordingly, industrial combination and integration of industry, especially in recent years, make the case even stronger against the duties that have been maintained or imposed on pig iron, steel billets, and such other primary or intermediate products as wire rods.

§ 3. What, then, should the future policy be? Mr. White, the Finance Minister, has recently declared himself opposed to high protection for the primary products, since he believes that they should be available at as low a price as possible. A minor revision was undertaken during the last session of Parliament (1914) and certain duties were increased. Consequently the iron and steel interests are expectantly awaiting the tariff revision which is likely to follow the next general election.

In the first place, the dumping clause ought to be abolished. If it could be proved that foreign competition were entirely shut out by the dumping clause, and that the Canadian prices are the trust price plus the duties and

transportation charges, no politician, and certainly no fair-minded Canadian, would favor the retention of the dumping clause. So far as the clause is violated it is useless. Meanwhile its application has given rise to endless confusion and uncertainty, not only in respect to facts, but principles. If protection is needed, it should be given in a definite form, and not according to a makeshift policy that is no protection, because its application is never determinable. The sooner the dumping clause is removed from the statute books the better.

Secondly, so much depends on the availability of cheap raw materials, and so considerable a part of the Canadian industry is built on the use of foreign ore, that a duty on the importation of raw materials, iron ore and coal, for the purpose of encouraging the use of Canadian resources, should not be imposed. Further, the admission of Newfoundland ore free of duty has the special merit of being a concession to a sister colony. The claim that the Canadian iron and steel industry should have more protection, on the ground that Canadian resources should be protected in order to be developed, and that such duties on raw materials would necessitate an increase in favor of subsequent stages of manufacture, is a proposition that cannot find favor with either the iron and steel industry or the public. Besides, a scheme of this kind would be a violation of those principles of conservation which have but recently secured such merited recognition in Canadian public opinion.

Thirdly, the duties on scrap iron, pig iron, steel billets, bar iron and steel, wire rods, and all other primary and intermediate iron and steel products, should be reduced. These goods should be admitted free of duty under the British preference. A small duty, equivalent to about $2\frac{1}{2}$ and 5 per cent *ad valorem*, imposed under the intermediate and general tariffs, would probably protect against the dumping of American products, without prohibiting absolutely the American producers from selling to Canadian

firms "duty paid," or without increasing the cost of the raw materials of the independent producers of finished goods beyond the cost to those producers who use these primary products in their own finishing mills.

This reduction of protection would force Canadian producers of pig iron and steel billets to extend their plants and to increase the scale of operations in order to reduce costs, just as the passing of the bounties led to the erection of nail mills at Sydney. There is little reason to suppose that an organization, as efficient as Mr. Plummer has recently declared the Sydney establishment to be, would not be able to improve its plant and expand its business to meet the importation of free pig iron and steel billets.

The reduction of protection on the raw materials would favor the finishing industry which, as a whole, is far more important to-day than the primary industry. Independent producers of finished products who have to buy their raw materials would have an opportunity to produce under conditions almost as favorable as those who produce their own raw materials which they turn into finished products. Consequently, the smaller firms now in existence would have a chance to develop their business and some new plants would be built. At all events, the tariff on primary products would no longer encourage the integration of industry, and what integration would take place would be based upon natural industrial forces, rather than artificial conditions.

So far as this study shows, protection has been most successful in developing the finishing industry. If it were increased, it would not be able to develop all branches of the industry, and it would be too costly in certain fields. In general, at the present time the protection to finished products might be reduced if the duties on the raw materials were reduced. In special branches of the industry protection might be practically abolished. The duties on steel rails might well be reduced to nothing under the British

preference, and to about five per cent under the general and intermediate tariffs. Plants that can sell at a profit in India, Great Britain, Mexico, etc., even in years of depression, scarcely need protection. Possibly Canadian railroads would then be able to complete their systems without making annual pilgrimages to Ottawa for subsidies that run into the millions. The same policy might also be followed in the small hardware lines, and in such other branches of the industry as a tariff commission or committee might determine. Other portions of the industry might be granted higher net protection for a few years of experimentation or until Canadian firms could get a grip on the market. If a committee undertook this work carefully, and if the duties were reduced when the industry had received the necessary stimulus, the consumers of finished products might benefit in the long run, producers of finished products certainly would gain at once, and producers of the primary and intermediate products would soon find that they could use an increasing amount of their raw materials in their own finishing mills, and could supply the increasing demand for such primary and intermediate products.

A recent development in steel-making has been favoring a new Canadian industry. Just as the extraordinary quality of the Quebec charcoal iron has been of the greatest importance in the success of those small Quebec furnaces, so the production of special kinds of steel for the manufacture of tools, steel rails, and high-speed steels may become an important basis for progress of the Canadian industry. Dr. Hérault, director of the Electro Metallurgical Works at La Praz, France, said that by 1915 Canada would be a great metallurgical country and that in time she will supply the world. This is probably the over-enthusiastic statement of a technical metallurgist, for under conditions which obtain in most of the settled regions of the world, neither pig iron nor ordinary steel can be pro-

duced in the electric furnace at a cost to compete with the ordinary furnaces. Under exceptional conditions, where cheap electric power can be obtained in the immediate vicinity of the ore, or where some special quality of product is desired, pig iron or steel can be produced profitably by electric furnaces. In due time, when fuel supplies become much scarcer than at present, electric smelting may have a considerable influence on the general development of iron and steel industries.[1] Meanwhile there is some reason why Canada, with extraordinary electric power, such as is obtainable at Sault Ste. Marie and many other places in Ontario and Quebec, should continue to expand this specialized branch of the iron and steel industry which she has already begun. When electric steel-making on a large scale becomes economically possible, the future of the iron and steel industry in Canada will be fully assured, by reason of Canada's unsurpassed water power and her reserves of iron ore of unknown extent and quality.

§ 4. It might be said that if pig iron and steel billets, as well as other goods, are to be practically free, it would be wise to renew the bounty system. This is impossible. The bounty system was introduced because it would give protection without increasing the price of the products. Duties would have cost those who used pig iron a part of the duty on all pig iron and steel billets consumed. Bounties cost the Government a definite amount only on that part of the annual consumption which was supplied by home producers. But to-day 80 to 95 per cent of the total consumption is produced in Canada, and if the rate of bounty were large enough to give real assistance, the bounty payments would be very burdensome to the Government.

This temporary merit of the bounty system suggests, then, the very reason why a bounty system is no longer expedient or desirable in Canada. Politically, it is unde-

[1] United States Geological Survey, *Report*, 1906, pp. 100–01.

sirable because there is a growing political influence in western Canada opposed to protection, and because the iron and steel interests themselves are none too favorable to the bounty system. The Liberals provided for ending bounty payments in 1910 to 1912, and the Conservative Government, though avowedly protective in its policy, has not seen fit to renew these favors to the iron and steel industry.

This political objection to the bounty system is merely the expression of more fundamental economic conditions. Mr. Fielding claimed that the bounties had been entirely repaid by the increase in customs collections. But, unfortunately for the bounty system, these collections have been made on imports of an entirely different character, purchased by other manufacturing interests, by the mineral, farming, and lumbering industries, and by the general consuming public, including the laboring class itself. In other words, the prosperity of the Canadian iron and steel industry, so far as it has depended on bounties, has been an actual burden on other industries which received little or no benefit from the development of the iron and steel industry. If it can be shown that the protective system itself has been superfluous, this count against the bounties is conclusively proved.

This criticism of the Canadian bounty system does not apply with so great force to the earlier period of development when, as has been said, a much smaller amount of bounties was paid. But according to the foregoing reasoning, the large payments of bounties in recent years have been an injustice of considerable importance to a part of the community which derived little or no direct benefit from the development of the industry. The payment of bounties on every variety of iron and steel production is an obvious impossibility which the revisers of the tariff clearly recognized in 1907 by the abolition of the bounties on the production of angles, tees, shapes, etc. Not only the variety

but also the volume of such production entirely prohibits such an application of the system. The actual cost in bounty payments would be altogether too large and the injustice to that part of the public that paid revenue duties on other goods would be obvious. That the iron and steel industry only should benefit is something which no fair-minded statesman or economist could support.

§ 5. Unfortunately the application of a protective policy is seldom determined on ultimate economic grounds. Undue recognition has been given to political interests. Canadian experience shows that the protective policy, as it usually works out, is a question of expediency rather than of principle. Fortunately enough, it has been not only economically but also politically expedient for the Canadian Government to reduce the total amount of protection granted the iron and steel industry in recent years. The fact that the operations of a protective policy bear the marks of expediency appears also in the illogical and inconsistent way in which it has been applied.

Of recent years there has been some leaning toward a theoretical justification for the doctrine of protection, through the quite general adoption of the infant industry argument, or the dynamic theory of protection. American political parties were for a brief moment agreed on the adoption of a so-called "cost of production" basis of protection. Protection, however, is frequently granted to industries where the infant industry argument does not apply because the conditions for development do not exist, or because the burden of protection is too great. It has been common for the Canadian Government to grant protection because articles were already made in the country in considerable quantities, or because there was evidence that mills would shortly be in operation. The general tendency is for the Government to accept uncritically the application of the infant industry argument to practically

every industry that has sufficient political dominance to claim support. The industry that would have protection should prove, first, that conditions are ripe for the application of that policy; second, that the general welfare of the country would be advanced in this way; and third, that the industry could not make satisfactory headway without protection, or that the favorable conditions would not themselves develop a satisfactory industry.

Along with the acceptance of the infant industry argument has gone a demand for the reduction of protection as the ability of an industry to compete was increased. The principle has appeared in the scheme of gradually reducing the bounties as the industry became solidly established. This feature of the bounty system was most creditable, because in the stages of its application the large payments required made it impossible to renew the system. Thus the application of protection to the Canadian iron and steel industry has merited less criticism than its application to many other industries or in many other countries.

The unqualified "cost of production" theory of protection has never been accepted in Canada. For this reason anthracite coal and coke are admitted into Canada free of duty and bituminous coal used for smelting purposes is admitted subject to a drawback of 99 per cent of the duty paid.

There is a danger that protection as a permanent policy may be adopted. Recently the iron and steel people have urged that protection should be increased. This claim is based on an alleged understanding that when the bounties disappeared compensatory protection in the form of duties would be given. The political change which put the traditionally protectionist party, the Conservatives, in power, has given the manufacturers the courage to ask for protection, whereas under the Liberal régime they were content to let the bounties pass away and to make the best of it by introducing internal economies.

Some have thought, too, that protection was granted to all interests. As a matter of fact, protection universally applied to all articles and stages of manufacture produces a situation in which the profits of one stage eat up the profits of the next. If the producers of iron ore secure protection in their favor, the blast furnace people must be given favorable duties to offset the increase in cost of production of pig iron. Likewise, the duties on pig iron eat up the special profits that accrue to steel-making by reason of the duties on steel billets; and so on down the list. The high prices obtained for protected articles are offset by the high cost of raw materials and by the high price of articles purchased for ultimate consumption. In other words, a consistent application of protective duties to all industries, by which one industry is as much favored as another, is of little value, because protection to one stage of the industry neutralizes that given to the next stage in the same industry, to say nothing of its effect on other industries.

Hence it is that the only method of making protection effective is to grant it to some stages of an industry, or to certain industries, or to permit certain industries to form monopolies while others find it impossible effectively to combine. In short, not all the country can benefit from protection, and what is the profit of one industry becomes the burden of another. Meanwhile this illogical application of protection gives rise to endless discussions of injustice, and the balancing of political influence, supported by already developed industries, decides what the commercial policy shall be, although it is the economic conditions that determine in a large measure the course of industrial development.

§ 6. This leads us again to the old and well-known principle of the plurality of causes. This study is a protest against the common error of regarding events as the outcome of a single factor. Just as an industry is complex, so

too the causes operating in favor of or against the industry are many and diverse. Some changes are adverse and some give assistance; some prohibit development and some make an expansion of industry possible. But if the effect of protection cannot be precisely determined, it is hoped that this study has at least made it apparent that a great number of causes have been at work, and it is suggested that the broader understanding of the forces underlying economic development in many spheres would give a basis for more informed, and, therefore, much wiser and more applicable, legislation.

Finally, it should be noted that these causes for economic movements are a network of influences interwoven in different directions and in different ways. General Canadian industrial development has built up an increasing market for iron and steel. It has called for the building of railways which has always resulted in an increase in the Canadian iron and steel industry. It has resulted in the discovery of ores of considerable importance, and it has found the labor supply and the capital necessary for large industrial undertakings. These minor phases of Canadian development are themselves interrelated. The whole process of Canadian economic organization goes far to explain the recent development of the iron and steel industry. Meanwhile the fact that the industry is so intimately connected with every phase of Canadian economic life suggests the conditions of success, and demands that a wise commercial policy in respect to iron and steel shall not retard any phase of that Canadian future which seems so promising.

THE END

APPENDIX

A

THE STATISTICAL PROGRESS OF CANADA[1]

Year ending June 30	Estimated population July 1[2]	Railway mileage		Gross liabilities of commercial failures	Imports and exports, total
		In operation	Yearly increase		
1851	2,384,409	159	—	—	—
1861	3,171,518	2,146	—	—	—
1868	—	2,270	—	—	$ 131,027,532
1869	—	2,524	246	—	130,889,946
1870	—	2,617	93	—	148,387,829
1871	3,689,257	2,695	78	—	170,266,589
1872	—	2,899	204	$6,454,525	194,070,190
1873	—	3,832	933	12,334,192	217,801,203
1874	—	4,331	499	7,696,765	217,565,510
1875	—	4,804	473	28,843,967	200,957,262
1876	—	5,218	414	25,517,991	174,176,781
1877	—	5,782	564	25,523,903	175,203,355
1878	—	6,226	444	23,908,677	172,405,454
1879	—	6,858	632	29,347,937	153,455,682
1880	—	7,194	336	7,988,077	174,401,205
1881	4,324,810	7,331	137	5,751,207	203,621,663
1882	—	8,697	1,366	8,587,657	221,556,703
1883	—	9,577	880	16,311,742	230,339,826
1884	—	10,273	696	15,994,361	207,803,539
1885	—	10,773	500	19,191,306	198,179,847
1886	—	11,793	1,020	8,861,609	189,675,875
1887	—	12,184	391	10,386,884	202,403,047
1888	—	12,585	401	14,081,169	201,097,630
1889	—	12,585	—	14,713,225	204,414,098
1890	—	13,151	566	18,289,935	218,607,390
1891	4,833,239	13,838	687	17,100,649	218,384,934
1892	—	14,564	726	13,766,191	241,369,443
1893	—	15,005	441	12,639,794	247,638,620
1894	—	15,627	622	17,616,215	240,999,889
1895	—	15,977	350	15,802,989	224,420,485
1896	—	16,270	243	17,169,683	239,025,360
1897	—	16,550	280	14,157,498	257,168,862
1898	—	16,870	320	9,821,323	304,475,736
1899	—	17,250	380	10,658,675	321,661,213
1900	—	17,657	407	11,613,208	381,517,236
1901	5,371,315	18,140	483	10,811,671	386,903,157
1902	—	18,714	574	10,934,777	423,910,444
1903	—	18,988	274	7,552,724	467,064,685
1904	—	19,431	443	11,394,117	472,733,038
1905	—	20,487	1,056	9,854,659	470,151,289
1906	—	21,353	866	9,085,773	550,872,645
1907	—	22,452	1,099	13,221,259	465,063,204
1908	—	22,966	514	14,931,790	650,793,131
1909	—	24,104	1,138	12,932,800	571,263,767
1910	—	24,731	627	14,514,650	693,211,221
1911	7,204,838	25,400	669	13,491,196	769,443,905
1912	—	26,727	1,327	12,316,937	874,637,794
1913	—	29,304	2,577	16,979,406	1,085,264,449
1914	—	—	—	—	1,129,744,725[3]

[1] Compiled from the *Report of the Department of Trade and Commerce*, 1913, part 4.
[2] W. J. Donald, "The Growth and Distribution of Canadian Population," *Journal of Political Economy*, vol. xxi, p. 306.
[3] *Canada Year Book*, 1913, p. 227.

B

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table I

Pig iron produced in Canada, upon which bounty has been paid by the Federal Government; pig iron, kentledge, and scrap iron for home consumption imported into Canada;[1] *the total consumption of pig iron in Canada, and the percentage of Canadian production to Canadian consumption*[2] *since 1883*

Fiscal year[3]	Pig iron production in Canada			Imports (tons)	Total consumption (tons)	Percentage of Canadian output to total consumption
	From Canadian ore (tons)	From foreign ore (tons)	Total (tons)			
1884.....	29,593	—	29,593	52,184	81,777	36.2
1885.....	25,770	—	25,770	43,398	69,168	37.3
1886.....	26,180	—	26,180	45,648	71,828	36.5
1887.....	39,717	—	39,717	50,214	89,931	44.3
1888.....	22,209	—	22,209	48,973	71,182	31.1
1889.....	24,823	—	24,823	72,115	96,938	25.6
1890.....	25,697	—	25,697	87,613	113,310	23.5
1891.....	20,153	—	20,153	81,317	101,470	20.0
1892.....	30,294	—	30,294	68,918	99,212	30.1
1893.....	46,948	—	46,948	63,522	110,470	42.5
1894.....	62,522	—	62,522	45,790	108,312	57.7
1895.....	31,692	35,000[4]	66,692	35,060	101,752[4]	65.2
1896.....	52,052	25,000[4]	77,052	37,141	114,193[4]	67.5
1897.....	33,254	35,000[4]	68,254	28,940	97,194[4]	70.0
1898.....	19,576	53,463	73,039	40,995	114,035	63.1
1899.....	31,861	46,594	78,047	48,594	126,641	61.6
1900.....	34,618	67,221	101,839	65,330	167,169	60.9
1901.....	99,758	50,581	150,339	40,282	190,621	78.9
1902.....	73,101	268,553	341,651	43,064	384,718	88.8
1903.....	46,450	274,741	321,191	99,814	421,005	76.8
1904.....	46,445	226,989	273,434	73,900	347,334	78.8
1905.....	59,452	327,267	386,719	77,538	464,527	83.3
1906.....	86,523	495,335	581,858	101,663	683,521	85.1
1907.....	67,224	349,041	416,265	231,041	647,677	64.5
1908.....	108,359	578,421	686,780	238,661	925,441	74.2
1909.....	97,826	511,605	609,431	73,781	683,212	88.0
1910.....	129,684	610,560	740,244	172,127	912,371	81.0
1911.....	52,893	534,576	587,469	290,624	878,093	66.9
1911[5].....	—	—	907,535	208,487	1,120,152	82.8
1912[5].....	—	—	1,014,587	212,565	1,280,176	79.9
1913[6].....	—	—	1,128,967	—	—	—

[1] *Canada Year Book*, 1911, p. 426.
[2] Estimated.
[3] Ending June 30, until 1907; March 31, thereafter.
[4] Estimated from Table IV. No bounty paid thereon. The Nova Scotia Steel Company was using Newfoundland ore in 1895.
[5] Calendar years; Canada, *Report on the Production of Iron and Steel in Canada*, 1912, p. 6.
[6] Canada, *Preliminary Report on Mineral Production in Canada*, 1913, p. 6.

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table II

Annual production of pig iron by Provinces, since 1886 [1]

Calendar Year	Nova Scotia (tons)	Ontario (tons)	Quebec (tons)	Total (tons)
1887	19,320	—	5,507	24,927
1888	17,556	—	4,243	21,799
1889	21,289	—	4,632	25,921
1890	18,382	—	3,390	21,772
1891	21,353	—	2,538	23,891
1892	40,049	—	2,394	42,443
1893	46,472	—	9,475	55,947
1894	41,344	—	8,623	49,967
1895	35,192	—	7,262	42,454
1896	32,351	28,302	6,615	67,268
1897	22,500	26,115	9,392	58,007
1898	21,627	48,253	7,135	77,015
1899	31,100	64,749	7,094	102,943
1900	23,133	62,387	6,055	96,575
1901	151,130	116,371	6,875	274,376
1902	237,244	112,688	7,970	357,902
1903	201,246	87,004	9,635	297,885
1904	164,488	127,845	11,121	303,454
1905	261,014	256,704	7,588	525,306
1906	315,008	275,558	7,845	598,411
1907	366,456	275,459	10,047	651,962
1908	352,642	271,484	6,709	630,835
1909	345,380	407,012	4,770	757,162
1910	350,287	447,273	3,237	800,797
1911	390,242	526,635	658	917,535
1912	424,994	589,593	—	1,014,587

[1] Canada, *Report on the Production of Iron and Steel in Canada*, 1912, p. 14.

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table III

Production of iron ore by Provinces, since 1885 [1]

Calendar year	New Brunswick (tons)	Nova Scotia (tons)	Quebec (tons)	Ontario (tons)	British Columbia (tons)	Total (tons)
1886	—	44,388	—	16,032	3,941	64,361
1887	—	43,532	13,404	16,598	2,796	76,330
1888	—	42,611	10,710	16,894	8,372	78,587
1889	—	54,161	14,533	—	15,487	84,181
1890	—	49,206	22,305	—	—	76,511
1891	—	53,649	14,380	—	950	68,979
1892	—	78,258	22,690	—	2,300	103,248
1893	—	102,201	22,076	—	1,325	125,602
1894	—	89,379	19,492	—	1,120	109,991
1895	—	83,792	17,783	—	1,222	102,797
1896	—	58,810	17,630	15,270	196	91,906
1897	—	23,400	22,436	2,770	2,099	50,705
1898	—	19,079	17,873	21,111	280	58,343
1899	—	28,000	19,420	25,126	2,071	74,617
1900	—	18,940	19,000	82,950	1,110	122,000
1901	—	18,619	15,489	272,538	7,000	313,646
1902	—	16,172	18,524	359,288	10,019	404,003
1903	—	40,335	12,035	209,634	2,290	264,249
1904	—	61,293	16,152	141,601	—	219,046
1905	—	84,952	12,681	193,464	—	291,097
1906	—	97,820	9,933	141,078	—	248,831
1907	—	89,839	12,748	207,769	2,500	312,856
1908	—	11,802	10,103	216,177	—	238,082
1909	—	—	4,150	263,893	—	268,043
1910	5,336	18,134	4,503	231,445	—	259,418
1911	31,120	22	3,616	175,586	—	210,344
1912	71,520	30,857	1,185	112,321	—	215,883

[1] Canada, *Report on the Production of Iron and Steel in Canada*, 1912, p. 9.

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table IV

Iron ore, and fuel charged to furnaces since 1886 [1]

Calendar year	Iron ore		Fuel		
				Coke	
	Canadian (tons)	Imported (tons)	Charcoal (bushels)	Made from Canadian coal[2] (tons)	Imported (tons)
1887	60,434	—	940,400	33,581	—
1888	54,956	—	804,286	30,228	—
1889	65,670	—	755,800	36,333	—
1890	57,304	—	589,860	34,073	—
1891	60,933	—	441,812	32,796	—
1892	96,948	—	1,121,365	52,622	—
1893	124,053	—	1,302,720	65,332	—
1894	108,871	—	1,173,970	60,026	—
1895	93,208	90,000[3]	789,561	51,629	—
1896	96,560	46,300	756,600	50,067	33,990
1897	53,658	55,722	1,031,800	35,800	27,810
1898	57,881	77,107	836,400	31,952	50,407
1899	66,384	120,650	1,928,025	44,844	64,648
1900	71,341	112,042	1,799,737	45,021	59,345
1901	156,613	361,010	1,835,736	207,835	115,367
1902	125,664	559,381	2,146,623	362,208	112,314
1903	82,035	485,911	2,322,030	350,190	96,540
1904	180,932	454,671	3,477,470	257,182	130,210
1905	116,974	861,847	4,404,394	365,897	243,882
1906	221,733	982,740	2,168,476	462,672	304,676
1907	244,104	1,117,260	1,682,085	521,068	327,082
1908	209,266	1,051,445	1,121,990	492,076	325,670
1909	257,502	1,235,000	1,779,258	412,016	507,255
1910	171,191	1,377,035	1,615,919	491,281	467,850
1911	97,732	1,628,368	1,960,459	543,933	577,388
1912	71,588	2,019,165	1,886,748	609,183	658,815

[1] Canada, *Report on the Mineral Production in Canada*, 1912, p. 81.
[2] Includes for the first ten years a small quantity of coal. [3] Estimated.

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table V

Production of pig iron in Great Britain, the United States, and the total world production [1]

Calendar year	Great Britain	United States	World
1500	6,000	—	60,000
1700	17,000	—	104,000
1806	258,206	40,000	460,000
1820	368,000	110,000	1,010,000
1830	678,417	165,000	1,585,000
1840	1,248,871	815,000	2,680,000
1850	2,300,000	564,755	4,422,000
1860	3,826,752	821,223	7,180,000
1865	4,819,254	831,770	9,292,000
1870	5,963,515	1,665,178	11,616,000
1875	6,365,462	2,023,733	13,708,000
1880	7,749,233	3,835,191	18,254,285
1885	7,297,295	4,044,526	29,479,287
1890	7,875,130	9,202,703	27,194,294
1895	7,703,459	9,446,308	29,385,853
1900	8,959,691	13,734,860	30,557,076
1905	9,608,086	22,992,380	53,201,008
1910	10,000,000	27,298,545	64,000,000

[1] Christopher Wood, *Iron and Steel, Their Production and Manufacture*, p. 144.

THE PRODUCTION OF IRON AND STEEL IN CANADA

Table VI

The production of steel ingots and castings in calendar years, and the imports of steel ingots and billets in fiscal years [3]

Year	Product [1] (tons)	Imports [2] (tons)
1894	28,767	
1895	19,040	
1896	17,920	
1897	20,608	
1898	24,125	
1899	24,640	4,847
1900	26,406	12,757
1901	29,212	11,699
1902	203,881	20,608
1903	203,296	19,695
1904	166,381	10,017
1905	451,863	15,891
1906	639,396	32,597
1907	706,982	19,150
1908	588,763	16,222
1909	754,719	8,887
1910	822,284	36,814
1911	882,396	48,395
1912	957,681	88,075
1913		90,557

[1] Canada, *Report on the Production of Iron and Steel in Canada*, 1912, p. 24.
[2] Canada, *Report of the Department of Trade and Commerce*, 1913, p. 234.
[3] Ending June 30, until 1907; March 31, thereafter.

C

THE OUTPUT OF IRON AND STEEL PRODUCTS IN CENSUS YEARS

TABLE I

Number of establishments of certain kinds and value of the products. Decennial figures, 1871–1911

	1871[1]		1881[2]		1891[2]		1901[2a]		1911[3a]	
	No.	Values	No.	Values	No.	Values	No.	Values	No.	Values
1. Iron and Steel products[b]	21	$2,852,380	26	$3,014,150	29	$4,380,010	29	$6,912,437	89	$34,613,710
2. Foundry and machine shop products[c]	430	7,325,531	548	8,773,957	548	17,164,030	315	15,292,445	514	45,611,416
3. Axes and tools	—	—	—	—	—	—	21	1,038,705	30	2,549,764
4. Bridges	—	—	—	—	6	728,075	6	1,693,000	11	6,502,410
5. Railway supplies	—	—	1	144,000	6	165,000	4	566,600	6	287,576
6. Screws	—	—	1	50,960	3	199,200	4	385,810	—	(See No. 1)
7. Wire	—	—	6	213,000	50	1,973,660	15	1,693,995	13	2,888,166
8. Wire fencing	—	—	1	12,000	—	—	14	336,490	19	2,603,907

[1] *Canada Year Book*, 1905, p. 121.
[2] *Fourth Census of Canada*, 1901, vol. ii, Table xvi.
[3] Fifth Census of Canada, Bulletin No. 1, 1911.
[a] For establishments employing five employees or more.
[b] Including bolts, nuts, forgings, hinges, nails, rivets, spikes, and rolling mill products.
[c] Including furnaces, heaters, iron pipe, machinery, radiators, stoves.

THE OUTPUT OF IRON AND STEEL PRODUCTS IN CENSUS YEARS

Table II

Number of establishments employing five employees or more, value of the capital invested, amount of salaries and wages, and values of the products, together with percentage increases for decennial years, 1891–1911 [1]

	1891	1901	1911
Establishments	520	517	824
Value of capital invested	$26,412,310	$40,861,164	$123,561,319
Percentage of decennial increase		54.71	202.39
Percentage of increase 1891–1911			367.82
Salaries and wages	$8,386,368	$11,782,720	$31,219,864
Percentage of decennial increase		40.50	164.96
Percentage of increase 1891–1911			272.27
Values of products	$28,535,789	$34,878,402	$113,640,610
Percentage of decennial increase		22.23	225.82
Percentage of increase 1891–1911			298.24

[1] Fifth Census of Canada, Bulletin no. 1, *Manufactures of Canada.*

D

RATES OF BOUNTY IN DOLLARS PER TON ON VARIOUS IRON AND STEEL PRODUCTS BY CLASSES AND BY YEARS — 1884–1912

Year	Pig iron made			Puddled bars	Steel billets and ingots		Rolled round wire rods	Certain manufactures of steel
	From native ore		From foreign ore					
	By usual process	By electric process				Made by electric process		
1884	$1.50[1a]	—	—	—	—	—	—	—
1885	1.50	—	—	—	—	—	—	—
1886	1.50	—	—	—	—	—	—	—
1887	1.50[2b]	—	—	—	—	—	—	—
1888	1.50	—	—	—	—	—	—	—
1889	1.50	—	—	—	—	—	—	—
1890	1.00[2b]	—	—	—	—	—	—	—
1891	1.00	—	—	—	—	—	—	—
1892	1.00	—	—	—	—	—	—	—
1893	2.00[3c]	—	—	—	—	—	—	—
1894	2.00	—	—	—	—	—	—	—
1895	2.00[4d]	—	—	$2.00[4e]	2.00[4e]	—	—	—
1896	2.00	—	—	2.00	2.00	—	—	—
1897	2.00	—	—	2.00	2.00	—	—	—
1898	3.00[5fg]	—	$2.00[5h]	3.00[5]	3.00[5i]	—	—	—
1899	3.00	—	2.00	3.00	2.00	—	—	—
1900	3.00[6j]	—	2.00	3.00[6]	3.00[6k]	—	—	—
1901	3.00	—	2.00	3.00	3.00	—	—	—
1902	3.00	—	2.00	3.00	3.00	—	—	—
1903	2.70[6j]	—	1.80[6j]	2.70[6j]	2.70[6]	—	—	—
1904	2.70[7l]	—	1.80[7l]	2.70[7l]	2.70[7l]	—	$6.00[7mn]	$3.00[7mn]
1905	2.25	—	1.50	2.25	2.25	—	6.00	3.00
1906	1.65	—	1.10	1.65	1.65	—	6.00	3.00
1907*	2.10[8p]	—	1.10[8p]	1.65[8p]	1.65[8p]	—	6.00[8p]	—
1908	2.10	—	1.10	1.65	1.65	—	6.00	—
1909	1.70	$2.10[8l]	.70	1.05	1.05	$1.65[8r]	6.00	—
1910	.90	2.10	.40	.60	.65	1.65	6.00	—
1911	—	1.70	—	—	—	1.05	6.00[9s]	—
1912	—	.90	—	—	—	.65	—	—

* Fiscal year ending June 30 until 1907. Calendar year beginning April 23, 1907.

1 43 Vic., 1883, chap. 14. *a.* $1.50 for a period of three years and $3 for three succeeding years.

2 49 Vic., 1886, chap. 38. *b.* $1.50 until 1890; $1 thereafter until 1892.

3 53 Vic., 1890, chap. 49. *c.* $2, 1892 to 1897.

4 57–58 Vic., 1894, chap. 9. *d.* 1894 to 1899.

e. When made in Canada from Canadian pig made from Canadian ore.

5 60-61 Vic., 1897, chap. 6.

f. Applicable to all pig iron made in Canada in proportion to the percentage of Canadian ore used. *g.* 1897 to 1902. *h.* In proportion to foreign, including Newfoundland ore used.

i. Steel to include steel ingots manufactured in Canada from ingredients of which not less than 50 per cent consists of pig iron made in Canada.

6 62–63 Vic., 1899, chap. 8.

j. All rates to decrease from the rates set forth in the 1907 schedule as follows: April 23, 1902, to June 30, 1903, 90 per cent; 1904, 75 per cent; 1905, 55 per cent; 1906, 35 per cent; 1907, 25 per cent.

k. No bounty to be paid on ingots made from puddled bars made in Canada.

7 3 Ed. VII, 1903, chap. 68.

l. The 1899 law was amended to read: 1903–04, 90 per cent; 1905, 75 per cent; 1906, 55 per cent; 1907, 35 per cent.

m. Articles produced from steel produced in Canada from ingredients of which not less than 50 per cent of weight consists of pig iron made in Canada.

n. Rolled round wire rods less than three quarters inch in diameter, when sold to wire manufacturers for use in their own factories in Canada in making wire.

o. On rolled angles, tees, channels, beams, joists, girders or bridge-building or structural sections, and other rolled shapes, not round, oval, square, flat, weighing not less than 35 pounds per yard, and also on flat eye bar blanks when sold for consumption in Canada.

p. On rolled plates not less than 30 inches in width nor less than one quarter inch thick when sold for manufacturing purposes for which such plates are usually required, not including plates to be sheared into plates of less width.

8 7 Ed. VII, chap. 24. *p.* Not payable on such iron and steel when exported from Canada.

q. Pig iron made in Canada from Canadian ore by electric process.

r. Steel manufactured by electric process direct from Canadian ore, and on steel manufactured by electric process from pig iron smelted in Canada by electricity from Canadian ore.

9 10 Ed. VII, chap. 33. *s.* Bounties on rods ended June 30, 1911.

E

BOUNTIES PAID ON IRON AND STEEL PRODUCTS, 1884–1912 [1]

Fiscal year [2]	Pig iron	Puddled bars	Steel	Manufactures of steel [3]	Total
1884	$44,090	—	—	—	$44,090
1885	38,655	—	—	—	38,655
1886	39,270	—	—	—	39,270
1887	59,596	—	—	—	59,596
1888	33,314	—	—	—	33,314
1889	37,234	—	—	—	37,234
1890	25,697	—	—	—	25,697
1891	20,153	—	—	—	20,153
1892	30,294	—	—	—	30,294
1893	93,896	—	—	—	93,896
1894	125,044	—	—	—	125,044
1895	63,384	—	—	—	63,384
1896	104,105	$5,611	$59,499	—	169,215
1897	65,509	3,019	17,366	—	85,894
1898	165,654	7,706	67,454	—	240,814
1899	187,954	17,511	74,644	—	280,109
1900	238,296	10,121	64,360	—	312,777
1901	351,259	16,708	100,058	—	468,020
1902	693,108	20,550	77,431	—	791,089
1903	666,001	6,702	729,102	—	1,401,805
1904	533,982	11,669	347,990	$15,324	908,962
1905	624,667	7,895	676,318	231,324	1,540,204
1906	687,632	5,875	941,000	369,832	2,004,339
1907	385,231	312	575,529	338,999	1,299,801
1908	863,817	—	1,092,201	347,135	2,303,153
1909	693,423	—	838,100	333,091	1,864,614
1910	573,969	—	695,752	538,812	1,808,533
1911	261,434	—	350,456	526,858	1,138,748
1912	—	—	—	166,750	166,750
1884–1895	$610,607	—	—	—	$610,607
1896–1912	7,097,041	$113,674	$6,706,990	$2,868,122	$16,785,827
Total	$7,707,648	$113,674	$6,706,990	$2,868,122	$17,396,434

[1] Compiled from *Reports on Mineral Production in Canada*, 1910 and 1912.
[2] Ending June 30 until 1907; March 31, thereafter.
[3] In 1904–06, $127,755 paid on angles and plates; the rest on rods.

F

RATES OF DUTY

TABLE I. *Rates of Duty on Certain Iron and Steel Imports, 1845-1914*

No. Articles	1845	1847	1849	1858	1859	1867	1868	1879	1887	1894	1896	1907		
												Preferential	Intermediate	General
1. Pig iron	4 %	1 %	2½ %	free	free	free	free	$2.00	$4.00	$4.00	$2.50	$1.50	$2.25	$2.50
2. Iron kentledge	—	—	—	—	—	—	—	—	4.00	4.00	2.50	1.50	2.25	2.50
3. Cast scrap iron	—	1 %	2½ %	free	free	free	free	2.00	4.00	4.00	2.50	1.50	2.25	2.50
4. Ferro-products and spiegeleisen	—	—	—	—	—	—	—	—	2.00	2.00	5 %	1.50	2.25	2.50
5. Wrought iron and steel scrap	—	1 %	2½ %	free	free	free	free	2.00	2.00	3.00 (95) 4.00	1.00	.50	.90	1.00
6. Iron and steel ingots, billets, blooms, slabs	—	1 %	—	5 %	10 %	free	5 %	12½ %	9.00	5.00	2.00	1.50	2.25	2.50
7. Steel billets, ingots.	—	—	—	5 %	10 %	free	5 %	10 % [1]	30 %	5.00	2.00	1.50	2.25	2.50
8. Puddled bars	—	—	2½ %	5 %	10 %	free	5 %	12½ %	9.00	5.00	2.00	1.50	2.25	2.50
9. Hammered bars	—	—	2½ %	5 %	10 %	free	5 %	17½ %	13.00	10.00	—	—	—	—
10. Rolled bars	—	—	—	5 %	10 %	free	5 %	17½ %	13.00	10.00	7.00	4.25	6.00	7.00
11. Rolled bar iron and steel	—	—	—	5 %	10 %	free	5 %	17½ %	13.00	10.00	7.00	4.25	6.00	7.00
12. Cast steel	—	—	—	5 %	10 %	free	free	—	—	—	—	free	5 %	5 %
13. Wrought steel	—	—	—	5 %	10 %	free	5 %	—	—	—	—	—	—	—
14. Iron and steel rails and bars	—	1 %	—	5 %	10 %	free	free	10% (s) 15 % (i)	6.00 (n. e. s.)	30 % (n. e. s.)	30 % (n. e. s.)	4.50	$6.00	$7.00
15. Nuts, washers, bolts, rivets, etc.	—	—	—	20 %	20 %	free	5 %	30 %	1½c. lb. +25 %	1c. lb. +20 %	¾c. lb. +25 %	¾ c. lb. +10 %	¾ c. lb. +20 %	¾ c. lb. +25 %
16. Wire rods	—	—	—	5 %	10 %	free	free	10 %	free	free	free	free	free	free
17. N.E.S.	4 %	1 %	2½ %	20 %	20 %	free	15 %	20 %	20 %	20 %	20 %	15 %	17½ %	20 %
18. Iron ore	—	—	2½ %	free	free	free	free	free	free	free	free	free	free	free
19. Coal, bituminous	—	1 %	—	free	free	free	free	$.50	$.60	$.60	20 % to $.53	$.10 to $.35	$.12 to $.45	$.14 to $.53
20. Coal, anthracite	—	1 %	—	free	free	free	free	.50	free	free	free	free	free	free
21. Coke	—	1 %	—	free	free	free	free	.50	$.50	free	free	free	free	free

[1] 1881, $12.00 min.

RATES OF DUTY

Table II

Acts affecting the customs rates on certain iron and steel products, 1845–1914

1845. 8–9 Vic., chap. 93, Statutes at Large.
An Act to regulate the trade of the British Dominions abroad, upon any articles imported into such possessions from countries other than Great Britain and British possessions.
1847. 10–11 Vic., chap. 31, repealed the imperial duties and reimposed a Canadian schedule of customs duties.
1858. 22 Vic., chap. 76.
1859. 22 Vic., chap. 2.
1867. 31 Vic., chap. 7.
1868. 31 Vic., chap. 44.
1870. 33 Vic., chap. 9, iron in blooms and billets made free; coal and coke subjected to a duty of $.50 per short ton.
1871. 34 Vic., chap. 10; coal and coke made free.
1879. 42 Vic., chap. 15.
1880. 43 Vic., chap. 18; bituminous coal, $.50 per ton; slabs, blooms, and billets, 10%.
1882. 45 Vic., chap. 6; iron and scrap of certain kinds, $1 per ton; steel billets free until 1883.
1883. 46 Vic., chap 13; iron and steel, old and scrap, free; rails free.
1884. 47 Vic., chap 30; wire rods less than one half inch in diameter, 5%; steel ingots, bars and other rods, $3 per ton + 10%.
1886. 49 Vic., chap. 18; slabs, blooms, billets, 10%; iron and steel, old and scrap, defined.
1887. 50–51 Vic., chap. 39.
1894. 57–58 Vic., chap. 33.
1897. 60–61 Vic., chap. 16.
1897. 61 Vic., chap. 37; British preference of 25% granted.
1900. 63–64 Vic., chap. 15; British preference made 33⅓%.
1903. 3 Ed. VII, chap. 15; iron and steel railway bars and rails, $7 per ton, put in force by order-in-council, August 27, 1904.
1907. 6–7 Ed. VII, chap. 11; drawback of 99% of duty on coal used for smelting purposes allowed.
1914. *Memorandum of the Department of Customs*, Canada, April 7, rolled iron and steel beams, etc., n. e. s. (weighing less than 120 pounds per lineal yard), general tariff, $7; intermediate tariff, $6; British preference, $4.50.
Wire rods, $2.25 under the British preference and $3.50 under the intermediate and general tariffs, provided that imported rods used in the manufacture of galvanized iron and steel wire numbers 9, 12, and 13 shall receive a drawback of 99 per cent of the duty paid.

G

EXPORTS AND IMPORTS OF IRON AND STEEL

TABLE I

Exports by years

Fiscal year [1]	Exports of iron and steel [2]	Exports of pig iron (calendar year) [3]	Exports of iron ore [2]
1868	$466,420	—	—
1869	401,770	—	—
1870	592,326	—	—
1871	766,111	—	—
1872	1,081,430	—	—
1873	1,492,306	—	—
1874	909,191	—	—
1875	727,105	—	—
1876	658,268	—	—
1877	546,266	—	—
1878	546,313	—	—
1879	446,602	—	$7,530
1880	719,163	—	76,474
1881	643,107	—	114,850
1882	664,312	—	135,463
1883	561,624	—	138,775
1884	465,935	—	66,549
1885	296,122	—	132,074
1886	276,098	—	23,039
1887	347,425	—	71,934
1888	423,488	—	89,945
1889	296,719	—	60,289
1890	294,728	—	31,376
1891	257,491	—	32,582
1892	243,867	—	36,935
1893	316,454	—	26,114
1894	295,924	—	9,026
1895	308,711	—	5,743
1896	506,946	$55,448	5,735
1897	522,988	81,881	2,492
1898	606,082	32,645	402
1899	706,411	149,190	4,968
1900	1,425,163	88,052	7,689
1901	1,432,661	593,739	150,657
1902	2,460,781	778,619	1,303,901
1903	3,263,940	78,382	733,230
1904	1,991,821	200,363	579,883
1905	1,123,354	22,284	540,909
1906	1,597,306	7,429	345,540
1907	1,109,746	13,504	65,367
1908	1,670,671	10,614	46,686
1909	2,489,987	186,778	71,663
1910	2,487,890	296,310	80,540
1911	2,671,927	271,968	304,718
1912	2,336,231	301,702	133,361
1913	3,084,565	—	—

[1] Ending June 30 until 1907; March 31, thereafter.
[2] Compiled from the *Report of the Department of Trade and Commerce*, 1913, part IV.
[3] Canada, *The Production of Iron and Steel in Canada*, 1912, p. 21.

EXPORTS AND IMPORTS OF IRON AND STEEL

TABLE II

Imports of iron and steel and manufactures thereof, dutiable and free, from Great Britain, the United States, and other countries, by years, 1874 – 1914 [1]

Fiscal year [2]	Dutiable from				Free of duty from			
	United Kingdom	United States	Other Countries	All	United Kingdom	United States	Other Countries	All
1874	$5,667,052	$6,170,681	$66,133	$11,903,866	$6,162,057	$2,837,431	$11,757	$9,011,245
1875	$5,805,232	4,923,852	80,311	10,809,395	6,264,938	2,067,056	14,274	8,346,268
1876	3,687,107	3,698,683	53,920	7,439,710	3,997,248	1,624,451	10,141	5,631,840
1877	3,111,017	3,728,075	29,300	6,868,392	2,981,109	690,890	3,521	3,675,520
1878	2,632,962	3,698,835	35,456	6,367,253	2,248,704	431,407	2,298	2,682,409
1879	2,361,439	3,348,236	39,445	5,749,120	1,528,640	342,524	1,564	1,872,728
1880	3,669,629	2,688,189	94,885	6,452,653	2,921,910	275,161	5,596	3,202,667
1881	4,041,697	3,667,876	190,941	7,900,514	4,055,953	280,334	21,318	4,357,605
1882	6,075,526	5,660,217	294,862	12,030,605	3,865,460	855,653	27,700	4,748,813
1883	6,723,258	6,897,492	258,473	13,879,223	3,947,819	1,582,601	26,915	5,557,335
1884	5,178,715	4,976,794	308,718	10,464,227	2,983,024	827,222	12,114	3,822,360
1885	3,985,065	3,553,246	284,759	7,823,070	2,352,542	584,290	9,405	2,946,237
1886	4,022,261	3,768,229	338,337	8,128,827	2,004,707	262,313	25,242	2,292,262
1887	5,342,281	4,092,797	444,442	9,879,520	2,385,960	247,614	93,091	2,726,665
1888	4,357,504	4,252,777	348,492	8,958,773	1,748,755	200,544	68,666	2,017,965
1889	4,858,789	4,569,831	402,938	9,831,558	2,198,186	274,418	92,391	2,564,995
1890	5,175,144	5,011,328	528,709	10,715,181	2,230,202	336,922	76,356	2,643,480
1891	4,702,200	4,934,969	520,121	10,157,290	2,982,897	592,573	62,812	3,638,282

[1] *Report of the Department of Trade and Commerce*, 1913, part I, p. 442.
[2] Ending June 30 until 1907; March 31 thereafter.

TABLE II (*continued*)

Fiscal year	Dutiable from				Free of duty from			
	United Kingdom	United States	Other Countries	All	United Kingdom	United States	Other Countries	All
1892	4,296,756	5,383,681	458,601	10,139,038	1,717,553	367,081	76,177	2,214,811
1893	4,287,760	5,460,462	517,767	10,265,989	2,067,647	360,660	62,854	2,491,161
1894	3,518,199	4,780,609	543,433	8,842,241	1,746,021	313,156	71,023	2,130,200
1895	2,135,159	5,067,180	367,436	7,569,775	953,729	325,063	28,344	1,307,136
1896	2,354,987	5,770,420	482,352	8,607,759	749,429	650,839	107,056	1,507,324
1897	1,748,937	6,580,029	352,497	8,781,463	827,960	1,106,517	32,943	1,967,420
1898	1,924,763	10,653,373	323,338	12,901,474	328,652	3,542,245	43,484	3,914,381
1899	2,335,821	13,173,175	369,708	15,878,704	385,593	3,835,294	59,389	4,280,276
1900	4,304,869	17,663,325	506,575	22,474,769	1,426,642	5,540,607	116,398	7,083,647
1901	2,617,124	16,054,867	421,101	19,093,092	786,123	7,056,379	244,771	8,087,273
1902	4,754,860	18,066,592	1,512,840	24,334,292	1,641,112	6,527,894	773,804	8,942,810
1903	7,348,621	21,375,077	2,403,940	31,127,638	2,803,168	7,073,983	1,286,180	11,163,331
1904	6,227,975	24,252,940	1,913,153	32,394,068	2,894,014	5,551,883	1,508,504	9,954,401
1905	5,437,435	24,849,709	1,177,100	31,464,244	1,172,944	9,413,261	314,227	10,900,432
1906	7,591,660	29,370,921	1,348,620	38,311,201	767,152	5,638,678	255,237	6,661,067
1907	7,873,672	29,231,419	1,143,672	38,248,763	1,171,755	4,634,285	281,337	6,087,377
1908	10,273,743	38,657,777	1,504,707	50,436,227	4,435,280	6,664,065	517,169	11,616,514
1909	5,406,008	26,080,026	835,123	32,371,157	2,956,394	4,829,622	560,588	8,346,604
1910	7,254,099	39,482,652	1,111,706	47,848,457	3,875,616	6,944,686	784,187	11,604,489
1911	10,436,159	56,662,927	2,014,608	69,113,694	4,211,195	7,598,002	848,587	12,657,784
1912	9,918,303	71,519,219	1,896,764	83,334,286	3,937,774	8,093,006	816,520	12,847,300
1913	10,394,276	106,471,427	1,747,785	118,613,488	4,271,473	14,096,857	1,666,546	20,034,876
1914[1]	8,549,090	71,410,117	1,414,904	82,746,922	4,559,873	10,568,344	1,776,353	16,464,570

[1] *Monthly Summary of Trade and Commerce*, December, 1913, nine months.

EXPORTS AND IMPORTS OF IRON AND STEEL

Table III

Value of Imports of pig iron, wrought scrap iron, steel billets, etc., and of ferro-products, by years, 1888–1914 [1]

Fiscal year [2]	Pig iron	Wrought scrap iron [4]	Steel billets, ingots, slabs, blooms and bars [4]	Ferro products
1880	$371,956	—	—	—
1881	715,997	—	—	—
1882	1,023,012	—	—	—
1883	1,144,749	—	—	—
1884	723,010	—	—	—
1885	572,759	—	—	—
1886	588,569	$158,100	—	—
1887	631,808	220,167	—	$1,435
1888	648,012	—	—	29,812
1889	864,752	333,092	—	72,108
1890	1,148,078	679,323	—	18,895
1891	1,085,929	652,842	—	23,930
1892	886,485	433,695	—	40,711
1893	766,567	567,907	—	15,858
1894	518,755	355,742	—	9,885
1895	372,130	217,531	—	5,408
1896	406,317	179,716	—	12,811
1897	327,161	91,169	—	9,233
1898	405,636	491,415	—	22,516
1899	472,034	298,243	—	22,539
1900	850,286	635,008	$362,463	39,064
1901	555,154	239,582	206,975	38,954
1902	585,803	519,398	419,543	150,977
1903	1,354,926	668,971	380,034	162,710
1904	894,728	298,196	219,045	75,554
1905	857,879	210,561	319,665	246,813
1906	1,401,047	325,371	663,794	462,739
1907	2,281,535	412,537	467,554	610,875
1908	3,493,600	506,698	600,012	612,062
1909	873,932	140,859	180,354	388,024
1910	2,127,135	191,782	678,524	382,486
1911	3,613,931	408,075	949,592	431,331
1912	3,512,969	547,942	1,641,919	469,884
1913	4,153,738	810,564	1,814,842	712,656
1914 [3]	2,294,363	514,940	842,441	723,104

[1] Compiled from the *Reports of the Department of Trade and Commerce*, especially 1905 and 1913, which give summaries of the imports for periods of years.
[2] Ending June 30 until 1907; March 31, thereafter.
[3] Monthly summary of commerce, December, 1914, nine months.
[4] Separate figures not available for earlier years.

EXPORTS AND IMPORTS OF IRON AND STEEL

Table IV

Value of Imports of steel rails, wire rods, bar iron and steel, and structural steel, by years, 1885–1914 [1]

Fiscal year [2]	Steel rails	Wire rods	Bar iron and steel	Structural steel
1885	$975,757	—	—	—
1886	905,125	—	—	—
1887	1,431,792	—	—	—
1888	1,232,531	—	—	—
1889	1,921,932	$225,037	—	—
1890	2,205,035	—	—	—
1891	3,197,280	—	—	—
1892	1,738,661	—	$232,243	$220,457
1893	2,349,789	—	174,381	267,439
1894	2,018,733	—	168,051	240,805
1895	926,113	—	109,116	250,427
1896	1,155,173	—	121,096	270,261
1897	1,526,211	654,538	139,312	338,139
1898	1,899,099	658,153	372,073	332,115
1899	1,800,842	765,777	448,592	365,201
1900	2,926,366	1,196,593	526,790	1,060,618
1901	3,742,509	645,136	448,942	659,740
1902	2,952,130	1,523,792	947,420	1,106,942
1903	4,489,968	1,415,447	1,328,342	1,329,077
1904	4,678,572	1,134,149	1,024,612	1,276,623
1905	5,533,923	792,078	875,654	1,766,872
1906	1,197,170	478,991	1,542,046	1,972,012
1907	1,867,865	806,039	2,147,785	—
1908	1,278,084	295,122	2,597,097	2,418,443
1909	797,479	538,378	1,211,217	1,998,566
1910	1,998,373	749,117	1,951,745	1,988,566
1911	895,984	935,912	3,180,525	3,102,340
1912	2,452,135	1,033,397	2,948,486	4.793,960
1913	3,847,865	2,144,405	3,916,748	5,261,613
1914 [3]	4,620,204	1,330,202	3,272,706	7,841,073

[1] Compiled from *Reports of the Department of Trade and Commerce*, 1905 and 1913.
[2] Ending June 30 until 1907; March 31, thereafter.
[3] Nine months ending December 31, 1914.

H

AMERICAN PRICES OF CERTAIN IRON AND STEEL PRODUCTS, BY YEARS, 1860–1912 [1]

Year	Pig iron (No. 1 Foundry Philadelphia)	Bar iron (best)	Rails		Nails	
			Iron	Steel	Cut	Wire
1860	$22.70	$58.75	$48.00	—	$3.13	—
1861	20.26	60.83	42.38	—	2.75	—
1862	23.92	70.42	41.75	—	3.47	—
1863	35.24	91.04	76.88	—	5.13	—
1864	59.22	146.46	126.00	—	7.85	—
1865	46.08	106.46	98.13	—	7.08	—
1866	46.84	98.13	86.75	—	6.97	—
1867	44.08	87.08	83.75	$166.00	5.82	—
1868	39.25	85.63	78.88	158.46	5.17	—
1869	40.61	81.67	77.25	132.19	4.85	—
1870	33.23	78.96	72.25	106.79	4.40	—
1871	35.08	78.54	70.38	102.52	4.52	—
1872	48.94	97.63	85.13	111.94	5.46	—
1873	42.97	86.43	76.87	120.58	4.90	—
1874	30.19	67.95	58.75	94.28	3.99	—
1875	25.53	60.85	47.75	68.75	3.42	—
1876	22.19	52.85	41.25	59.25	2.98	—
1877	18.92	45.55	35.25	45.58	2.57	—
1878	17.67	41.24	33.75	42.21	2.31	—
1879	21.72	51.85	41.25	48.21	2.69	—
1880	28.48	62.04	49.25	67.52	3.68	—
1881	25.17	58.05	47.13	61.08	3.09	—
1882	25.77	54.51	45.50	48.50	3.47	—
1883	22.42	44.24	—	37.75	3.06	—
1884	19.81	38.45	—	30.75	2.39	—
1885	17.79	36.59	—	28.52	2.33	—
1886	18.71	38.08	—	34.52	2.27	—
1887	20.93	43.59	—	37.08	2.30	$3.15
1888	18.88	39.67	—	29.83	2.03	2.55
1889	17.76	38.30	—	29.25	2.00	2.49
1890	18.41	41.25	—	31.78	2.00	2.51
1891	17.42	38.38	—	29.92	1.86	2.04
1892	15.75	36.79	—	30.00	1.83	1.70
1893	14.52	33.53	—	28.12	1.44	1.49
1894	12.66	26.88	—	24.00	1.08	1.11
1895	13.10	28.09	—	24.33	1.56	1.69
1896	12.95	27.22	—	28.00	2.36	2.54
1897	12.10	24.73	—	18.75	1.47	1.46
1898	11.66	23.93	—	17.62	1.31	1.45
1899	19.37	43.75	—	28.12	2.21	2.60
1900	19.98	48.12	—	32.29	2.46	2.76
1901	15.87	40.38	—	27.33	2.29	2.41
1902	22.19	43.53	—	28.00	2.29	2.15
1903	19.92	39.59	—	28.00	2.36	2.13
1904	15.57	33.17	—	28.00	2.01	1.96
1905	17.88	41.89	—	28.00	2.50	1.93
1906	20.98	43.23	—	28.00	2.13	1.98
1907	22.40	40.87	—	28.00	1.86	1.82
1908	17.24	39.87	—	28.00	1.83	1.99
1909	17.46	39.42	—	28.00	1.82	1.77
1910	17.36	37.00	—	28.00	1.84	1.88
1911	15.71	32.80	—	28.00	1.71	1.81
1912	16.56	35.00	—	28.00	.71	1.74

[1] *Mineral Industry*, 1909, pp. 423–24, and United States, *Bulletin of the Bureau of Labor*, no. 114, March, 1913.

I

THE COMBINATION MOVEMENT IN THE CANADIAN IRON AND STEEL INDUSTRY

Table I

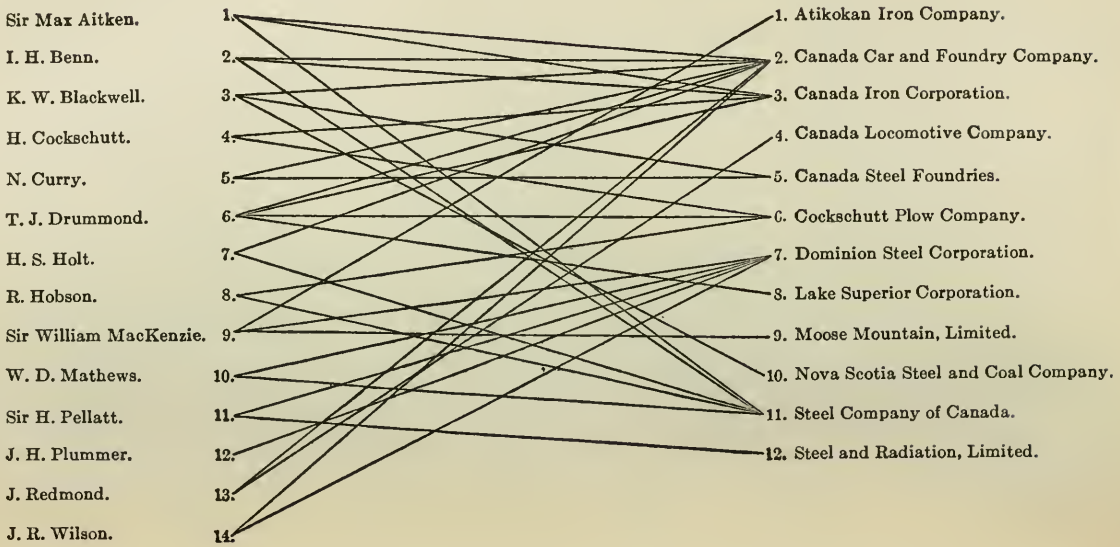
Amalgamations

Canada Car and Foundry Company.
  Formed in 1910 to include
    Canada Car Company;
    Dominion Car and Foundry Company;
    Rhodes Curry Car and Foundry Company;
    Pratt and Letchworth Company (added in 1911);
    Canadian Steel Foundries (stock ownership).
Canada Iron Corporation.
  Formed in 1908 to include
    Mines in Ontario;
    John McDougall & Company;
    Drummond Iron Mining Company;
    Annapolis Iron Mining Company;
    Canada Iron Furnace Company;
    Canada Iron and Foundry Company;
    Londonderry Iron and Mining Company.
Canadian Steel Foundries.
  Formed in 1911 to include
    Montreal Steel Works;
    Ontario Iron and Steel Company.
Dominion Steel Corporation.
  Formed in 1909 to include
    Dominion Coal Company, an earlier consolidation,
      Sydney and Louisburg Railway Company, formed 1909 as a subsidiary.
    Dominion Iron and Steel Company;
    Cumberland Railway and Coal Company, an earlier consolidation, added in 1910.
    Sydney Lumber Company (stock ownership, 1911).
Lake Superior Corporation.
  Formed in 1905 to control, besides miscellaneous industries,
    Algoma Steel Corporation, 1911;
      Algoma Steel Company;
      Algoma Commercial Company;

Cannelton Coal and Coke Company (added in 1912);
Fiborn Limestone Company (added in 1912).
Nova Scotia Steel and Coal Company.
Formed in 1901 to unite
General Mining Association, 1829;
Nova Scotia Steel Company, 1895;
New Glasgow Iron, Coal and Railway Company, 1891;
Nova Scotia Steel and Forge Company, 1892;
Nova Scotia Steel Coal Company;
Nova Scotia Forge Company.
Eastern Car Company (added in 1912, all stock owned).
Steel and Radiation Company.
Formed in 1910 to unite
Expanded Metal Company;
King Radiator Company;
Taylor-Forbes Company;
Dominion Radiator Company.
Steel Company of Canada.
Formed in 1910 to unite
Hamilton Iron and Steel Company, 1899;
Hamilton Blast Furnace Company;
Ontario Rolling Mills Company;
Canada Bolt and Nut Company, 1910;
Toronto Bolt and Forging Company;
purchased the McDonnell Rolling Mills in 1903;
Gananoque Bolt Company;
Brantford Screw Company;
Belleville Iron and Horseshoe Company;
Montreal Rolling Mills;
Pillow-Hersey Company;
Hodgson Iron and Tube Works (purchased in 1906);
Canada Screw Company;
Ontario Tack Company (purchased);
Dominion Wire Manufacturing Company.
United States Steel Corporation.
Owned Dominion Wire Manufacturing Company, 1905–10;
Wire plant at Hamilton;
United States Steel Products Company;
Sandwich plant proposed;
Iron ores?

Table II

Chart showing interlocking directorates, 1912



J

TARIFF MEMORIALS

I. Memorial to Minister of Finance

November 21, 1911.

To the Honorable The Minister of Finance, Ottawa, Ont.

Sir, —

This statement is respectfully submitted for the consideration of the Government, on behalf of the following companies, comprising all the manufacturers of iron and steel in Canada: Dominion Iron and Steel Company, Limited, Sydney, Nova Scotia; Nova Scotia Steel and Coal Company, Limited, New Glasgow, Nova Scotia; Londonderry Iron and Mining Company, Limited, Londonderry, Nova Scotia; Canada Iron Corporation, Limited, Radnor, Drummondville, Quebec, and Midland, Ontario; Deseronto Blast Furnace, operated by R. J. Mercur & Co., Deseronto, Ontario; Steel Company of Canada, Limited, Hamilton, Ontario; Algoma Steel Company, Limited, Sault Ste. Marie, Ontario; Atikokan Iron Company, Limited, Port Arthur, Ontario.

Since the last general revision of the tariff in 1897 serious changes have taken place in the fiscal policy of the country affecting the manufacture of pig iron and steel. At that date there were bounties in force, which, when added to the existing duties, gave a protection equal to $4.50 per ton on pig iron, and $7 to $8 per ton on steel billets.

The British preferential tariff brought about a general reduction, until the present rates were fixed in 1907. It was definitely understood that on the withdrawal of the bounties, these lowered duties would be readjusted, but nothing whatever was done, and when the bounties ceased in December, 1910, the industry was left with the following inadequate duties on its basic products: —

On pig iron, preferential, $1.50 per ton; general, $2.50 per ton.

On steel billets, preferential, $1.50 per ton; general, $2.50 per ton.

The average value of these commodites, under ordinary trade conditions, may be taken as $15 for pig iron and $22 for billets, so that the prefcrential tariff, which largely governs prices, gives

a protection of 10 per cent on pig iron and 7 per cent on steel billets.

The effective protection given in 1897 and later years has thus been reduced on these articles to about one third or less. That the earlier protection was effective is shown by the increase in production.

In 1900 the total amount of pig iron produced in Canada was 96,575 tons, and of steel, 26,456 tons.

In 1910, the totals were, pig iron, 740,244 tons; steel, 740,290 tons.

The present position of the iron and steel trade may be thus summarized: —

1. Prior to 1910 the combined protection afforded by the duties and bounties enabled manufacturers to retain a sufficient hold on Canadian business, notwithstanding the competition from abroad.

2. In 1910 the protection was so far reduced by the decrease in bounties as to make it more difficult to retain the trade, while their cessation on December 31 of that year, which left the manufacturers to the protection afforded by the present inadequate tariff only, has rendered this difficulty more acute.

3. The depressed state of the iron and steel trade abroad, coupled with our inadequate tariff, affect the Canadian trade by making it difficult, in some cases impossible, to hold the business it has hitherto had. Some manufacturers have expended a large amount of capital, and come under serious financial commitments in connection with extensions of their plants, in order to increase their output, and the possible future effect of the conditions above named is to them a cause of great anxiety.

It is not desirable that we should now enter on the question of duties on more finished articles; any representations on these matters are reserved for the Tariff Commission; but we should at least point out how seriously these duties are weakened by the numerous exemptions.

The manufacturers of the most important lines of agricultural implements, of springs, axles, tools, bedsteads, windmills, etc., have, in effect, free iron and steel, and in many cases the materials made free are those whose manufacture had been specially promoted by the tariff as it stood before the exemptions were granted. These exemptions are one of the main causes of the difficulties in which we find ourselves.

Another cause is the application of low rates of duty to the larger sizes and sections of rolled steel. This has shut out the

Canadian mills from a large and important field, and restricted them to the manufacture of the smaller sections.

The only other branch of business to which we would refer is the manufacture of wire rods. The consumption in Canada of wire rods, wire, and wire products, is not far short of 200,000 tons yearly, and less than one half are made in Canada from Canadian raw materials. Since the cessation of the bounty wire rods are entirely unprotected; they do not even share in the protection accorded to the billets from which they are made. It is respectfully urged that the anomalous position of this important industry, which cannot be remedied until the whole tariff is dealt with, calls for immediate relief, and adds special weight to the request we are herein preferring.

The statement of the imports of iron and steel into Canada for the fiscal year ending 31st March, 1911, shows that the Canadian manufacturers have a large field yet to occupy. The unrevised trade returns show imports of: —

537,863 tons of steel of value of		$14,868,752
270,102 tons of pig iron of value of		3,613,931
Total....807,965	Valued at...	$18,482,683

These imports are in quantity not far short of the entire present production of the Canadian plants, indicating ample field for growth, which, however, cannot be occupied to any great extent under the existing tariff with its discriminations and exemptions.

The cost of labor represents approximately 80 per cent of the cost of manufacture of iron and steel, and the above figures indicate that about $12,000,000 was paid by Canada in wages to foreign workmen, for iron and steel imported in the year referred to, much of which ought to have gone to Canadian workmen.

A large increase in the amount of iron and steel made in Canada would, therefore, not only help the industry by reducing costs, and providing an adequate return upon capital, to the encouragement of further development, but would build up industrial populations in Canada, by providing a large amount of well-paid work, now done for us abroad. It is respectfully urged that such protection should be accorded as will enable these results to be reached.

We would also call attention to the fact that the larger portion of the imports above referred to come from the United States, and that most of the goods thus brought into Canada, under a

tariff which is either very low or is rendered ineffective by exemptions, are subject to a very high rate of duty when entering the United States.

Further, when depression exists in the United States, as at present, Canada is their nearest and most available slaughter market. The "dumping" clause is effective where a fair rate of duty is imposed, but where goods are free, or are subject to a nominal duty only, the "dumping" clause is not effective, and large quantities of iron and steel are now being sold in Canada at or below the American cost of production. This makes the need of some relief for the iron and steel trade a very immediate and pressing question.

As to the view which the community may take if it is proposed to relieve one special trade from the disadvantages under which it labors, while others with a similar claim to consideration are untouched, we would respectfully urge that the establishment on a sound footing of the great basic industries of iron- and steel-making is universally regarded as one of the primary needs of the country, and has been so considered by Parliament for the past twenty-five years. We are of the opinion that the lowering of duties on iron and steel which was made possible, or at any rate rendered less injurious, by reason of the bounties, the continuance of these duties at the lower rates when the bounties are gone, and the consequent inadequacy of the protection afforded to these industries, need only to be made known to secure full support for any reasonable remedy from all who desire to see Canada prosper.

The Government having announced that a Tariff Commission will be appointed, it is assumed that it will not be possible to deal with any changes in the tariff until the Commission has completed its inquiry and made its report.

We respectfully submit that the position of this industry in respect to the tariff, and the competition to which it is exposed from countries laboring under great depression in the iron and steel trades, justify us in asking special and immediate consideration from the Government, and that some protection should be accorded, pending the results of the inquiry by the Commission. The iron and steel trade of Canada has during the whole of the present year suffered under the inadequate protection above referred to, and unless some form of relief is now given, it must continue to suffer for probably two years to come, so that the development of the industry would be seriously retarded. Since no change in the duties can at present be made, it is respectfully

suggested that there should be a temporary bounty on pig iron as the basis of the industry.

Such a bounty should be regarded as a partial compensation for the disabilities under which the industry has been placed through the lowering of duties, exemptions, and discriminations referred to, and through the withdrawal of bounties without any readjustment of the duties, and should further be regarded as in the nature of a temporary measure of justice, pending a full consideration of the whole question by the Government.

We have the honor to be, Sir,

Your obedient servants,

Dominion Iron and Steel Company, Limited,
J. H. Plummer, *President.*
Nova Scotia Steel and Coal Company, Limited,
Thomas Cantley, *General Manager.*
Londonderry Iron and Mining Company,
John J. Drummond, *Managing Director.*
The Canada Iron Corporation, Limited,
Edgar McDougall, *Vice-Pres. and General Manager.*
Deseronto Iron Furnace Co.,
R. J. Mercur & Company, Operating.
The Steel Company of Canada,
R. Hobson, *Vice-Pres. and General Manager.*
Algoma Steel Company, Limited,
T. J. Drummond, *President.*
Atikokan Iron Company,
By William Mackenzie.

Canadian Imports

Extracts from the Trade and Navigation returns for the Year ending 31st March, 1911

Tariff Items

375. Pig iron: 270,102 tons; value, $3,613,931.

Of this quantity, 151,349 tons, valued at $2,084,729 came from the United States. It is estimated that nearly one half of the quantity imported from the United States was used in the manufacture of articles, which, under Schedule B of the Customs Tariff, obtained a rebate of 99 per cent of the duty.

Canadian duty: Preferential, $1.50; General, $2.50.

United States duty: $2.50.

376. Iron or steel billets, ingots, blooms, slabs, bars, etc., less finished than iron or steel bars, but more advanced than pig iron: 47,684 tons; value, $929,652.

Canadian duty: Preferential, $1.50; General, $2.50.

United States duty: $6 per net ton.

377. Rolled iron or steel angles, tees, beams, channels, girders, and other rolled shapes or sections, under 35 pounds per yard: 56,516 tons; value, $1,580,387.

Of this quantity, 43,613 tons came from the United States, valued at $1,262,409.

Canadian duty: Preferential, $4.25; General, $7.

United States duty: $8 per net ton.

378. Bar iron or steel, rolled; rounds, ovals, squares, flats, etc. N.O.P.: 104,895 tons; value, $3,179,921.

Of this quantity, 84,650 tons, valued at $2,533,747, came from the United States, quite one half of which was used in the manufacture of articles named in Schedule B of the Customs Tariff and obtained rebate of 99 per cent of the duty.

Canadian duty: Preferential, $4.25; General, $7.

United States duty: $6 per net ton.

379. Rolled iron or steel beams, channels, angles, etc.: 124,985 tons; value, $3,209,773.

Of this quantity, 78,167 tons, valued at $2,134,678 came from the United States.

Canadian duty: Preferential, $2; General, $3.

United States duty: $8 per net ton.

379A. Flat eye bar blanks and universal mill plates, over twelve inches wide, for use in manufacture of bridges, structural work, or in car construction: 24,525 tons; value, $658,847.

Canadian duty: Preferential, $2; General, $3.

United States duty: $10 per net ton.

380. Boiler plate of iron or steel, not less than 30 inches in width, for use in the manufacture of boilers: 15,994 tons; value, $492,247.

Canadian duty: Free.

United States duty: $10 per net ton.

381. Rolled iron or steel plates, not less than 30 inches in width: 49,398 tons; value, $1,223,212.

Canadian duty: Preferential, $2; General, $3.

United States duty: $10 per net ton.

382. Rolled iron or steel sheets or plates, sheared or unsheared and skelp iron or steel N.O.P.: 25,467 tons; value, $756,212.

Canadian duty: Preferential, $4.25; General, $7.

United States duty: $10 per net ton.

387A. Steel in bars or sheets: when used in the manufacture of shovels: 1,556 tons; value, $44,546.

Canadian duty: Preferential, $2; General, $3.

United States duty: $6 per net ton.

394. Cast-iron pipe of every description: 25,046 tons; value, $562,008.

Canadian duty: Preferential, $6; General, $8 per net ton.

United States duty: $5 per net ton.

458. Locomotive and car wheel tires of steel in the rough: 9,600 tons; value, $45,253.

Canadian duty: Free.

United States duty: $5 per net ton.

470. Iron or steel masts, and iron or steel beams, channels, etc., for use in manufacture of ships: 14,165 tons; value, $417,981.

Canadian duty: Free.

United States duty: $8 per net ton.

471. Rolled round wire rods, $\frac{3}{8}$ in. and under: 36,032 tons; value, $965,912.

Canadian duty: Free.

United States duty: $6 per ton.

472. Materials which enter into the construction of cream separators: value, $396,501.

Canadian duty: Free.

Exclusive of pig iron the foregoing shows imports during the year ending March 31, 1911, of

Steel	537,863 tons	of a value of	$14,868,752
Pig iron	270,102 "	" "	3,613,931
Total	807,965 "	" "	$18,482,683

Of the foregoing importations, —

317,786	tons were subject to duties of		$1.50	preferential and		$2.50	per ton general.	
186,878	"	"	"	4.25	"	"	8.00	"	"
200,464	"	"	"	2.00	"	"	3.00	"	"
66,191	" were free								
75,000	" [estimated] were subject to a rebate of 99 per cent.								

It is estimated that of total importations of iron and steel into Canada less than 150,000 tons were subject to the highest duties; $4.25 preferential and $7 general.

II. Anonymous

Prices on Steel Bars, etc., at Pittsburg (taken from the "Iron Age," January 4, 1912) during the years 1906 to 1910 inclusive: —

	For home consumption	For export to Canada
High point, 1907–08	$1.60 per 100 lbs.	$1.50 per 100 lbs.
Average	1.47½ per 100 lbs.	1.37½ per 100 lbs.
Low point, April, 1909	1.15 per 100 lbs.	1.10 per 100 lbs.
High price, 1911	1.40 per 100 lbs.	1.30 per 100 lbs.
Average price, 1911	1.26 per 100 lbs.	1.20 per 100 lbs.
Low price, 1911	1.08 per 100 lbs.	1.00 per 100 lbs.

At the beginning of 1910, prices at Pittsburg were about $1.50 per hundred pounds for home use and $1.40 for export to Canada; decline was gradual during that year and early 1911, but during the second half of 1911 prices weakened rapidly, falling as low as $1.08 to $1.10 for home consumption, and on attractive specifications as low as $1 for Canada.

American furnaces in Lake Superior district have been selling iron at $11.50 Duluth for delivery into Canada. This is away below cost of manufacture.

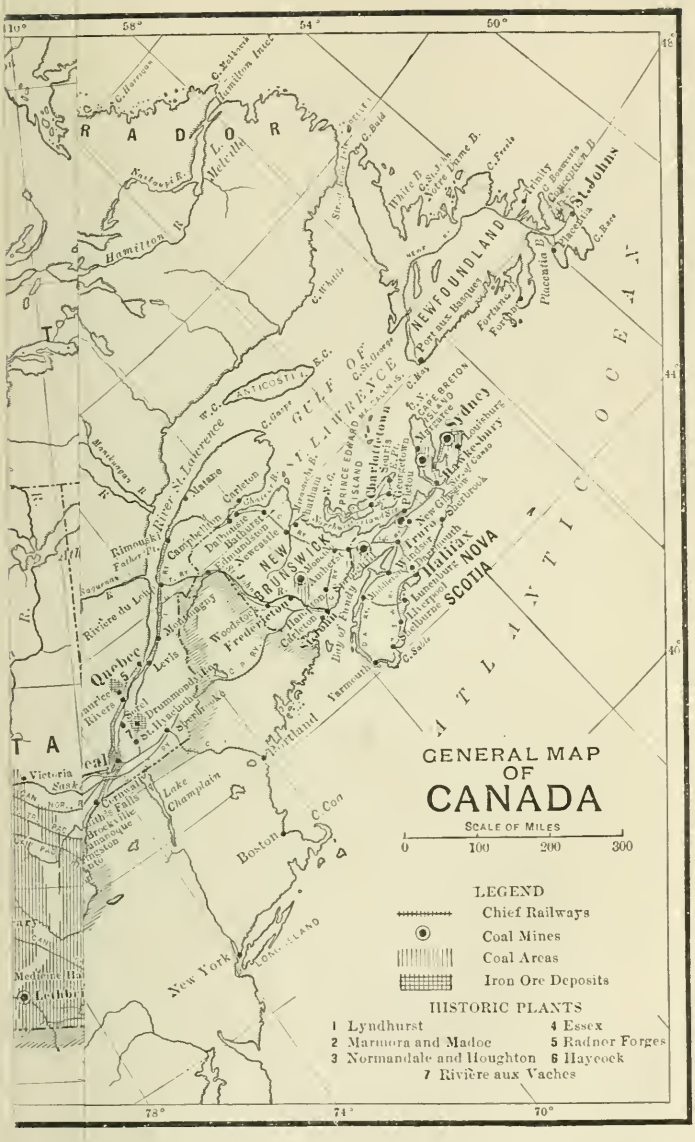
Buffalo furnaces sell at a lower price outside Buffalo district than within Canada, a large quantity of iron having recently been sold in Canada by Buffalo furnaces at from $12.50 to $13.00; the trade recognize that this is below cost.

Average prices on foundry pig iron at principal consuming points in the northern United States, as compared with prices at Toronto and Montreal: —

	Chicago district	Buffalo district	Toronto district	Montreal district
1906	$21.40	$20.25	$19.50	$17.75
1907	25.50	24.50	20.00	18.50
1908	18.50	17.50	19.00	17.25
1909	18.50	17.50	18.25	17.00
1910	18.00	17.00	18.25	17.25
1911	16.00	15.00	17.50	16.75
High	$27.85	$26.75	$21.00	$19.00
Average	19.65	18.60	18.75	17.40
Low	15.00	14.50	16.75	16.25
January, 1912	$15.50	$15.00	$17.25	$18.00

It is a well-understood condition of the iron trade throughout the world that makers of pig iron require to average up their profits by the prices they receive in good years to enable them to overcome the losses they sustain in lean years. The foregoing shows that the American makers of pig iron secured prices for their products, for instance, in 1907 that enabled them to meet the low prices ruling in 1911. The Canadian producers failed to attain this position, for the reasons given below. The figures will further show that the Canadian consumer of pig iron has been able, during the past seven years, to buy his metal on the average at lower prices than could the American consumer in his own market. The conditions affecting the Canadian iron industry injuriously were: —

1. Home competition.
2. Keen competition from British iron made with cheap labor


GENERAL MAP
OF
CANADA
SCALE OF MILES
0 100 200 300
LEGEND
Chief Railways
Coal Mines
Coal Areas
Iron Ore Deposits
HISTORIC PLANTS
1 Lyndhurst
2 Marmora and Madoc
3 Normandale and Houghton
4 Essex
5 Radnor Forges
6 Hayeock
7 Rivière aux Vaches
LABRADOR
NEWFOUNDLAND
St. Johns
GULF OF ST. LAWRENCE
NEW BRUNSWICK
NOVA SCOTIA
Halifax
Sydney
Quebec
Montreal
Ottawa
Toronto
Kingston
Victoria
Boston
New York
ATLANTIC OCEAN
58°
54°
50°
78°
74°
70°

I. General Map of Canada

and admitted at preferential duty of $1.68 per gross ton, or equal to about 10 per cent *ad valorem*. This competition was very marked in the East, at seaboard points, and extended to a greater or lesser extent as far west as the head of the Lakes.

3. Crushing competition in bad years from United States makers, especially in the Buffalo district, iron being dumped on the Canadian market at unremunerative prices, figures named for export to this country being often fully $2 per ton lower than those charged to local consumers in the districts of the United States furnaces. The "dumping" clause of the tariff could not, however, be applied, as Buffalo furnaces sometimes sold part of their product for delivery to distant points in their own country at prices as low as for shipment to Canada.

During the period of years from 1906 to 1911 inclusive the highly developed industry of the northern United States received approximately $18.50 per gross ton at the furnace for its product, whereas the undeveloped Canadian industry received about $17.50 at furnace.

Prices on foundry pig iron delivered at principal consuming points in Ontario, such as Toronto, Hamilton, Brantford, Galt, Guelph, etc., during the years mentioned below: —

	U.S.	English	Canadian	
1906	$23.50	$19.50	$19.50	Avge. $18.85 delivered.
1907	27.75	20.25	20.25	$1.10 Freight from
1908	20.75	19.00	19.00	furnace.
1909	20.50	18.25	18.25	$17.75 at Canadian
1910	20.00	18.50	18.50	furnace.
1911	18.00	18.50	18.00	$16.15 at Canadian
Jan., 1912	17.25	19.00	17.25	furnace.

From the above it will be noted that prices on Canadian-made pig iron are governed by the lowest prices obtainable from outside sources.

It is estimated that fully 75,000 tons of pig iron are imported annually by manufacturers of agricultural machinery, on which a rebate of 99 per cent of the duty is allowed, equal to about $2.80 per gross ton from United States sources and $1.68 from English sources. This rebate would have to be absorbed by Canadian furnaces to secure this share of the business.

64°
63°
62°
61°
60°
50
ANTICOSTI I.
GULF
OF
ST. LAWRENCE
C. Gaspe
Gaspe Bay
MISCOU I.
SHIPPIGAN I.
MAGDALEN
ISLANDS
Cape North
North Pt.
Pignish
PRINCE EDWARD
ISLAND
Malpeque B.
East Pt.
Souris
Summerside
Charlottetown
Georgetown
C. Bear
CAPE BRETON
ISLAND
Whycocomagh
George
Bay
Antigonish
Baddeck
Sydney
Glace Bay
Louisburg
Moncton
Amherst
Pictou
New Glasgow
Stellarton
Westville
Ferona
Springhill
Londonderry
Truro
Bridgeville
Mines
Basin
Wolfville
Windsor
Dartmouth
Halifax Harbor
Halifax
Lunenburg
Liverpool
COLCHESTER
GUYSBOROUGH
HALIFAX
Chedabucto B.
Canso
Map of
Maritime Provinces
Chief Railways
Coal Areas
Iron Ore Deposits
SCALE OF MILES
0
50
100
Greenwich
64°
63°
62°
61°
60°

II. Map of the Maritime Provinces

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BIBLIOGRAPHY

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Many of the sources of information, particularly the earlier papers, give chief attention to the matter of resources, but, of recent years, the tariff and bounties, trusts and finance, have come into prominence. Porritt's articles and books on protection and bounties are unnecessarily partisan on the free-trade side, and unfortunately devote too much attention to the political aspects of the situation. *Sixty Years of Protection in Canada* suffers from the lack of an intensive knowledge of the individual schedules; *The Revolt in Canada* is altogether too dogmatic in character to be convincing. Mr. McLean's *The Tariff History of Canada*, while accurate, is rather non-critical. Unfortunately it does not cover the period from 1894 to the present. The *House of Commons Debates* are not a valuable source of detailed information. Mr. Field's annual discussions of industrial combinations describe financial phases of the Canadian mergers; but little attempt has been made to estimate the actual extent of consolidation. Mr. G. E. Drummond's numerous papers on the Canadian iron industry give the fairest statement of the case for protection. Of Government documents, the reports on the *Production of Iron and Steel in Canada* are by far the most valuable. The annual reports and pamphlets issued by the iron and steel companies themselves, together with the circulars of established financial houses, the prospectuses of corporations, and the memorials presented to the Government in favor of protection are, however, quite interesting, and contain most significant information.

The following list of references is practically complete, except in respect to short articles published in a number of trade and other journals. A reference to the indices of these journals will unearth many more sources generally referred to under Group II. The more important of such articles have been listed. The abbreviations which follow the list of trade journals and bulletins explain the references in Group VII.

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